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THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

MAY 19 1982

The Honorable George Bush
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

In compliance with The Chrysler Corporation Loan Guarantee Act of 1979, PL 96-185, we are pleased to submit herewith the Department of Transportation's report, The U.S. Automobile Industry, 1981. This report deals with developments in the auto industry during 1981 and with future prospects for the industry.

In April of 1981, President Reagan asked the Secretary of Commerce to provide overall leadership for the implementation of actions to help the auto industry and for review of how Government policy affects the industry. As one consequence of the President's decision, the Department of Commerce is currently preparing a legislative proposal for transferring future responsibility for this annual report from the Department of Transportation to the Department of Commerce.

Sincerely,

Drew Lewis

Enclosure

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THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

MAY 19 1982

The Honorable Thomas P. O'Neill, Jr.
Speaker of the House of Representatives
Washington, D.C. 20515

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EXECUTIVE SUMMARY

The Chrysler Corporation Loan Guarantee Act (PL 95-185) requires the Secretary of Transportation to prepare and submit to Congress an annual assessment of the U.S. automobile industry. The first report, The U.S. Automobile Industry, 1980, discussed many of the basic causes of the problems faced by the industry. This report deals with developments during 1981 and with future prospects for the industry.

Actions to Help the U.S. Automobile Industry

In April 1981, on recommendation of a task force headed by the Secretary of Transportation, President Reagan announced his initiatives to help the U.S. auto industry. The cornerstone of the initiatives was the President's Economic Recovery Program, including spending cuts, tax reforms, and general regulatory relief. The Economic Recovery Tax Act of 1981, passed later in the year as part of that program, contained important provisions to help industry, including the auto industry, to generate cash for increased investments. Its Safe Harbor leasing provision enabled Ford, Chrysler and American Motors to generate more than $200 million for plant and tooling investment.

The President's initiatives to help the auto industry included 34 specific actions aimed at reducing the regulatory burden on the industry. All of these regulatory actions were begun in 1981. Implementation was completed on 17 in that year and 6 more were implemented in the first 5 months of 1982. With the possible exception of one requiring legislative change to the Clean Air Act, the others will be implemented in 1982. Subsequent to the April announcement of the auto initiative, the President asked the Secretary of Commerce to provide overall leadership for the implementation of the actions to help the auto industry and for review of how Government policy affects the industry.

Sales and Finances in 1981

1981 was a poor year for the industry. Sales of domestic-built cars and trucks were down 6.2 percent from 1980, itself a poor sales year, and down 31 percent from the peak year of 1978. One out of every four vehicles bought in the United States in 1981 was imported. Industry losses, which had reached an unprecedented $4.2 billion in 1980, were cut by two thirds, to $1.3 billion in 1981. Despite the poor sales year and the continuing import penetration, the U.S. auto industry made significant progress in cutting its costs and improving its plant and product to more than double the funds generated by operations.

In 1981, the industry invested $13.1 billion in new plant and tooling, an increase of $1.5 billion over 1980. Since 1978, the industry has invested more than $43 billion in changing its product to the fuel-efficient vehicles the public demands and in improving its manufacturing plant efficiency. Of that amount, only about $20 billion was generated by current operations. The remaining $23 billion spent for plant and tooling came from the sale of long-term debt and increases in other long-term liabilities ($10.3 billion), decreases in working capital ($10.2 billion), and issuance of stock ($2.6 billion). By the end of 1981, most of the U.S. auto manufacturers had drawn down their cash reserves well below traditional levels.

To deal with near term cash flow problems and reduce operating costs, the manufacturers have consolidated plant operations, closed down excess capacity and laid off blue collar and white collar employees. They have shortened supply lines to save transportation costs and have begun implementing a variety of productivity-improvement measures. At year end, when sales slumped badly, the manufacturers made drastic cuts in production to control inventory.

Dealers and Suppliers

New car dealers were severely affected by the year-end sales decline. More than two thirds of the 984 domestic new car retail outlets that closed in 1981, did so during the second half of the year. The failure rate was lower than in 1980, when 1607 outlets closed, in part because of better cost control and in part because of improved income from used car sales and from service revenue.

Industries supplying parts and materials to the auto manufacturers were affected by the overall drop in auto sales, by the reduction in quantity of materials needed to manufacture smaller, more efficient vehicles, by the changes in design of new-model vehicles, and by modifications in the traditional sourcing pattern of the prime manufacturers. Several of the supplier firms were able to reduce costs and improve their revenue/cost margins in 1981. Those firms selling to the aftermarket, as well as to prime manufacturers, benefited from the counter-cyclical increase in sale of replacement parts.

Employment and Productivity

The number of automobile workers either temporarily or indefinitely laid off totalled 279,400 at the end of 1981 -- 41,400 greater than at the end of 1980. Unemployment is likewise heavy in automotive supplier industries. It is likely that significant unemployment in the industry will persist through the year and beyond. For the long-term, the domestic manufacturers need to improve their operations and reduce their costs substantially if they are to be cost competitive in domestic and world markets. While their improved competitive stature will increase worldwide sales and enhance job security, many of the actions to improve productivity will reduce the amount of labor needed to produce each vehicle. The employment impacts of sales increases and production efficiency improvements will tend to offset each other, so that the work force may not regain its 1978 level even though the market recovers substantially.

Prospects for the Future

In the near term, the industry's prospects depend primarily on the timing and strength of the auto sales recovery that will accompany the expected economic turnaround. The re-negotiation in the spring of 1982 of union contracts with the two leading U.S. manufacturers, as well as with several primary supplier firms, represents a significant contribution toward the industry's capability to cut costs and to take advantage of an improving market. The Japanese government has announced that it will continue its voluntary restraint on exports of cars to the U.S. in 1982 at the same level as in 1981. Any sales volume increase in 1982 will thus benefit primarily the U.S. industry.

In the longer term, the industry faces the challenge of becoming more cost competitive with foreign manufacturers. The production cost advantage currently held by the Japanese must be overcome if the U.S. manufacturers are to compete successfully in world markets and combat further foreign penetration in the domestic market. U.S.-built vehicles are already technically competitive in terms of performance, safety and scheduled maintenance and the manufacturers are instituting techniques aimed at improving manufacturing efficiency and quality.

Supplier Industry Prospects

Among the techniques introduced in Japan and now being applied in some U.S. plants is the "just-in-time" system. This technique, which reduces inventory and other related costs, involves close coordination between prime manufacturers and suppliers in the delivery of parts and materials only as they are needed for the next stage of production. As it is more widely employed, the "just-in-time" system may restructure the automobile supplier industry as firms may have to modify production methods to coordinate more closely with the needs of the prime manufacturers.

The supplier industry also faces stiff international competition as the prime manufacturers search to find low cost sources and as developing nations institute local-content regulations. The Administration has been working to insure free reciprocal trade between the U.S. and our trading partners. As the various barriers to trade are lifted, the supplier industry should be able to expand its export market. The supplier firms will likewise benefit from improvement in domestic auto sales.

Dependence on the Economy and Industry Initiatives

In announcing his program for the auto industry, the President stated that recovery for the industry depends primarily upon re-establishment of a strong and stable economy. This is still as true as it was then. Within that context, policies pursued by management and labor will determine, far more than anything the government could or should do, the long-term future prospects for the industry.

FOREWORD

The principal intent of this report is to assess developments in and affecting the U.S. Automobile Industry in calender year 1981. Some material relating to the first quarter of 1982 has been included as available where it emphasized or explained 1981 trends. The year 1982 will be covered fully in a future report.

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Chapter I. -- INTRODUCTION

Requirement for the Report

In December of 1979 Congress passed the Chrysler Corporation Loan Guarantee Act which, in Section 12(b), directed the Secretary of Transportation to: "...prepare and transmit to Congress annual comprehensive assessments of the state of the automobile industry and its interaction in an integrated economy." This report is the second annual assessment. The first assessment, The U.S. Automobile Industry, 1980, was released in January 1981 by outgoing Secretary of Transportation Neil Goldschmidt.

Conclusions of the 1980 Report

The recent difficulties of the automobile industry have not been caused solely by a capricious market. The 1980 report pointed out a number of deep-seated problems:

- The U.S. consumer, as has his counterpart in the rest of the world, has developed a preference for the fuel economy of smaller cars. U.S. automakers will continue to face stiff competition from foreign automakers in the U.S. home market.

- Foreign manufacturers have the experience to build small cars and have invested in the facilities needed to make them; many enjoy excellent reputations for high-quality vehicles. They also have good dealer and service organizations in the U.S.

- The Japanese auto manufacturers, because of management factors, lower labor rates, and more modern equipment, enjoyed an average landed cost advantage per vehicle of $1,000 to $1,500 in 1980.

- The U.S. auto manufacturers need to complete an investment of more than $70 billion in new facilities, equipment and research to bring the new generation of fuel-efficient, high-quality, price-competitive products to market. Management has to examine the methods by which it runs its business and adopt new management systems aimed at building cars with less manpower, less energy, and less waste. Similarly, production workers have to cooperate in an effort to improve the quality of the product and the productivity of the plant.

- Lower wages in competing countries will put pressure on the U.S. work force to limit pay increases.

- Protectionist actions by some other countries have tended to strengthen their respective auto industries while erecting barriers to the import of U.S.-built cars and equipment.

Federal Actions to Help the Auto Industry

Shortly after his inauguration, President Reagan asked the incoming Secretary of Transportation, Drew Lewis, to chair a cabinet-level task force on the problems of the U.S. auto industry. Beyond the conclusions of the 1980 report, the task force took special note of the heavy burden that federal regulation had imposed on the industry. The task force findings and recommendations were forwarded to the White House in mid-March. Simultaneously, the Administration began discussions with the Japanese government concerning the serious problem that Japanese exports of autos were creating for U.S. manufacturers.

On April 6, the President announced his program for the automobile industry. That program included economic actions directly assisting domestic manufacturers, regulatory relief, and other policy initiatives. In announcing his program, the President designated the Department of Commerce (DOC) as the agency to implement it. Also, in recognition of its long-standing responsibility for improving international trade, DOC was directed to monitor the progress of automotive trade relations with Japan.

Tax Measures

In announcing his actions to help the auto industry, the President noted that the cornerstone of that initiative was his Economic Recovery Program which included spending cuts, tax reforms and general regulatory relief. Included in the measures aimed at revitalizing the nation's economy which stemmed from the Economic Recovery Program were those which encouraged industry -- including the auto industry -- to invest in the tooling and in the research needed for recovery.

The Economic Recovery Tax Act of 1981 (ERTA), which implemented the tax reform aspects of the President's program, contains provisions (retroactive to January 1981) which effectively reduces corporate rates, allowing for accelerated depreciation of investments, and permitting "Safe-Harbor" sale and leaseback of equipment. Under the "Safe-Harbor" provision, a firm not currently liable for corporate income taxes but making an investment in new equipment can arrange to, in effect, sell the tax credit and depreciation allowances on that equipment to a currently taxable firm. The investing firm can thus obtain nearly the same tax benefits on an investment in new equipment as a currently taxable firm.

It is the "Safe-Harbor" feature of the ERTA which has most directly benefited the auto industry so far. Chrysler has used the "Safe-Harbor" provision to generate $38 million in cash from a leasing arrangement involving $215 million worth of equipment. Similarly, Ford generated $153 million on an arrangement involving nearly $1 billion worth of equipment and AMC generated about $10 million.

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Regulatory Reform

The program included review, rescission or reproposal of 34 auto-related regulations which were projected to save the industry $1.4 billion in capital costs and consumers $9 billion over a five year period. Actions taken, and expected to be taken, on the regulations are shown in Table I.

Table I. ACTIONS ON REGUATORY REFORM

IMPLEMENTATION ACCOMPLISHED IN 1981	
(Final rule issued or administrative action taken)	
Environmental Protection Agency (8)	
Adopt a self-certification program for vehicles to be sold at high altitude.	4/81
Forego assembly-line testing at high altitudes.	4/81
Initate consolidated NO_x waiver proceedings for light-duty diesel-powered vehicles.	9/81
Initiate consolidated CO waiver proceedings for light-duty vehicles.	7/81
Do not require use of onboard technology for the control of hydrocarbon emissions resulting from the fueling of motor vehicles.	4/81
Streamline the motor vehicle certification program.	10/81
Reduce the annual number of assembly line test orders.	4/81
Explore deferring standards for paint shops.	10/81
National Highway Traffic Safety Administration (9)	
Delay implementation of first phase of "208 Standard" (passive restraints for large cars, model year 1982).	4/81
Rescind requirement for manufacturers to install automatic occupant restraints, e.g., air bags or automatic belt systems to protect all front seat occupants, beginning in Model Year 1982 (passive restraints on all cars).	10/81
Rescind the "Fields of Direct View" requirements for passenger cars.	6/81
Terminate rulemaking on "Fields of Direct View" for trucks, buses and multipurpose passenger vehicles.	7/81
Withdraw the ANPRM on post-1985 fuel economy standards.	4/81
Eliminate the new steering column lock-up requirement and grant other minor exemptions to the Theft Protection Standard.	12/81
Terminate rulemaking on Low Tire Pressure Warning indicators.	8/81
Terminate rulemaking on design testing and labeling of batteries.	8/81
Modify the recently issued Hydraulic Brake Performance Standard for light trucks, buses and vans.	12/81

IMPLEMENTATION TO BE COMPLETED IN 1982	
Environmental Protection Agency (8)	
Revise the statutory HC and CO standards for heavy-duty trucks to a level that would not require catalysts.	
Relax the 10 percent Acceptable Quality Level to 40 percent for assembly-line testing of light and heavy trucks.	
Delay assembly-line testing for heavy-duty engines.	
Relax the statutory NO_x emission limits for heavy-duty engines.	
Institute NO_x emission averaging for light and heavy trucks.	
Institute emission averaging for diesel particulate emissions.	
Adopt equivalent non-methane hydrocarbon standards as an option for all vehicles.	
Relax test vehicle exemption requirements.	
National Highway Traffic Safety Administration (8)	
Modify the existing bumper standard to meet the statutory requirements that such a standard be as cost effective as possible.	5/82
Amend the regulation creating the uniform Tire Quality Grading System.	
Delay the regulation on safety belt comfort and convenience and consider further action.	2/82
Terminate rulemaking on safety problems associated with multiple rims on trucks and buses.	2/82
Rescind the standard on speedometers and odometers.	2/82
Propose eliminating information requirements on Tire Reserve Load (still under investigation); and reduce minimum advance notice required before tire production may start.	2/82
Streamline and reduce fuel economy report requirements.	2/82
Propose changing Federal Vehicles Identification Number requirements from a Federal Motor Vehicle Safety Standard to an administrative regulation.	
IMPLEMENTATION DATE UNCERTAIN	
Environmental Protection Agency (1)	
Eliminate the 1984 high-altitude requirement. (Legislative action is included in the Administration's proposed Clean Air Act amendments).	

Other Policy Initiatives

Three other initiatives in the President's program have not yet been fully implemented:

Antitrust The President asked the Attorney General to expedite consideration of the industry's request to vacate the 1969 "smog decree" as soon as a pending appeal was concluded. The decree prohibited certain joint statements by the industry to governmental agencies concerned with auto emission and safety standards and exchanges between companies of certain technical information on emission-control devices.

On June 29, after the issue had been remanded from the Court of Appeals back to the district court level, the Department of Justice advised the district court that the government wished to withdraw its motion to extend the smog decree provisions. On August 3 the court agreed. In February, 1982, the court required that Justice publish its proposed modifications for a 60-day comment period.

Coincident with the President's announcement, the Department of Transportation (NHTSA) waived the prohibition on joint submissions on all of its future regulatory initiatives, and EPA adopted a liberal waiver policy and announced that it would consider requests to make joint statements on a case-by-case basis.

On March 4, 1981, the Federal Trade Commission, on its own initiative, withdrew subpoenas for records in its long-standing investigation of the auto industry. The FTC concluded that substantial changes in the industry had occurred since the investigation began in 1976.

Labor The Department of Labor proposed to provide increased assistance to displaced auto workers by restructuring Federal programs for retraining and relocation through the existing employment and training delivery system. While the Labor Department did conduct an "experienced worker demonstration" in Wayne County, Michigan that assisted some displaced auto workers, the need for reducing Federal spending to revitalize the general economy prevented expanded funding for worker assistance.

Accelerated Federal Procurements The Administration proposed to accelerate the Federal procurement of motor vehicles by $100 million in fiscal year 1981. The initial budget proposal by the General Services Administration contained a request for $100 million for accelerated purchase of cars and trucks. The request was denied in the House and the Senate.

Import Monitoring

In mid-1981 the Department of Commerce established a system to monitor imports of automobiles from major U.S. trading partners. In particular, this system is designed to permit a direct comparison of U.S. import and Japanese export data. The Department publishes monthly reports of its findings under this import monitoring program.

Other Actions and Developments Related to International Trade

On May 1, 1981, the Government of Japan announced that it would unilaterally restrain automobile exports to the United States for two and possibly three years, beginning April 1, 1981.

For the first year (April 1981 through March 1982), the Japanese indicated that their passenger car exports to the United States would be limited to 1.68 milllion units, using Japanese Automobile Manufacturers' Association (JAMA) data. Because shipments to Puerto Rico and of "car-derived vans" to the continental United States are excluded from JAMA passenger car export data, separate measures were taken later by the Government of Japan to restrain these exports. The Japanese announced that for the first restraint year exports of "car-derived vans" to the continental United States would be limited to 82,500 units, and that passenger car and vans to Puerto Rico would be limited to 70,000 units.

For the second year, the Japanese Government originally indicated its intention to adjust the 1.68 million unit level by 16.5 percent of the estimated increase in total U.S. passenger car sales from the first year of the restraint. Given continued sluggishness in the U.S. passenger car sales during 1981, and considerable uncertainty about the probable level of such sales in the 1982, on March 29, 1982 the Japanese Government announced it would hold the second-year export restraint to the 1981 level.

Based on its May 1981 announcement, the Government of Japan intends to monitor auto exports to the United States during the April 1983-March 1984 period. Action to restrain exports during this period will only be taken if deemed necessary, and then in a manner determined by the Japanese Government. Export restraint and/or monitoring will not be extended beyond March 31, 1984.

The Commerce Department's monitoring system shows that during the first eleven months of the first restraint year (April 1981-February 1982), about 1.4 million passenger cars were shipped to the United States from Japan. This represents approximately 84 percent of the 1.68 million unit ceiling established by the Japanese Government for the first restraint year.

Auto Parts Buying and Selling Missions

The International Trade Administration of DOC sponsored a Japanese auto parts buying mission to the United States in September 1980 as well as an auto parts selling mission to Japan in November 1981. In April 1981, the Japanese eliminated tariffs on 38 auto parts categories in response to requests from the U.S. Government. Through the Joint U.S.-Japan Trade Facilitation Committee (TFC), DOC is conducting a two-year program to monitor the results of the purchasing missions, and to seek additional ways to increase sales of U.S. auto parts to Japan and in the U.S. aftermarket (replacement market) for Japanese-made cars.

At the December 1981 TFC meeting, U.S. representatives expressed deep concern about the growing imbalance in U.S. Japan auto parts in 1981. The Government of Japan responded that the imposition of the unilateral restraint on auto exports to the United States made the $300 million forecast for 1981 unrealistic. However, Japanese respresentatives agreed to work toward the steady increase in Japanese purchases of U.S. auto parts during 1982.

U.S. Discussions With Mexico on Auto Trade and Investment Issues

Through their participation in the U.S.-Mexico Joint Commission on Commerce and Trade: Sector Study on Autos, the Commerce Department and the Special Trade Representative are working to promote a cooperative approach toward the future development and growth of the U.S. and Mexican motor vehicle industries. A series of four to six bilateral meetings is planned for 1982 as part of this effort.

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Chapter II. -- AUTO INDUSTRY PERFORMANCE IN 1981

Automotive Sales

Overall Sales Pattern

The 1981 new car and light truck market continued the decline that began in 1979, although the underlying sources of the decline appear to have varied during the period (as discussed below in Factors Influencing the Auto Market). The 1979-81 sales pattern is illustrated by the smoothed curve of Figure 1.1/Sales of light trucks (up to 10,000 lbs gross vehicle weight) declined sharply as well. Despite early hopes that 1981 would see the beginning of a rebounding automotive market, a fourth quarter slump -- which has continued into 1982 -- caused year-end total sales to drop to 8.5 million cars (down 5 percent from 1980) and 2.0 million light trucks (down 8.2 percent).2/

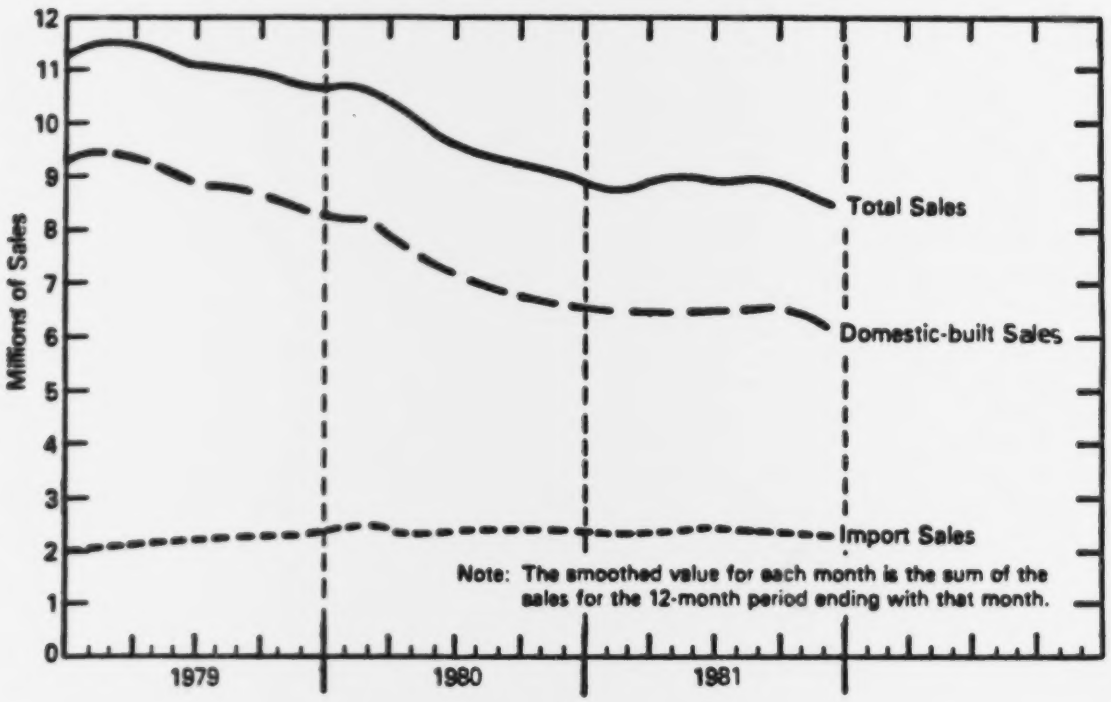

Figure 1 Smoothed Auto Sales, 1979–1981

1/ The smoothing technique uses a running 12-month sum of monthly sales to remove seasonal variations within the year. The value plotted for each month is the total for the year ending with that month. The December value is thus the calendar year total while the September value is, approximately, the model year total.

2/ Except where noted, data presented in this section were compiled by TSC from material published by the Motor Vehicle Manufacturers Association and Wards Automotive Reports. Annual data refers to the calendar year and vehicle size classifications use the industry categories.

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There were few "winners" by country, company or nameplate in the 1981 U.S. auto market (Table II). U.S. domestic-built cars declined in sales by 5.7 percent and trucks, by 8.4 percent. Import car sales as a whole declined by 3.1 percent and trucks, by 7.6 percent. Japanese car sales did a little better than most imports, declining only 2.6 percent. Only French and Swedish imports, on the strength of improved sales of Renault, Peugeot, Volvo and Saab, showed a sales improvement, but their combined market share is only 1.5 percent of the total U.S. sales volume.

The higher-priced import car companies did relatively well as a group, with Mercedes, Audi, BMW, Porsche and Ferarri showing sales increases. Cadillac, the larger size Oldsmobile and Buick, and Chrysler Imperial sales improved as well, but only the Chrysler Corporation, with a 10.6 percent improvement in car sales over 1980, showed a net company gain. General Motors, Ford, American Motors, and Volkswagen of America all showed net decreases in total vehicle sales.

Because their sales declined less rapidly than domestic-built car and truck sales, the imports increased their market penetration in 1981. All imported car sales totaled 27.2 percent of the car market and 21.9 percent of the truck market. The Japanese held 80 percent of the 1981 imported car market and all of the imported light truck market. After an increase in sales volume in 1979, Japanese car and compact truck sales remained relatively flat in 1980 and 1981. The decline in total car sales, and the increase in percent market segment for small cars through 1979 and 1980, appear to have been caused largely by the decline in large car sales (Figure 2). In 1981, however, large car sales appeared to "bottom out" at 32 percent of the market in February and large cars had a 37 percent share by year's end.

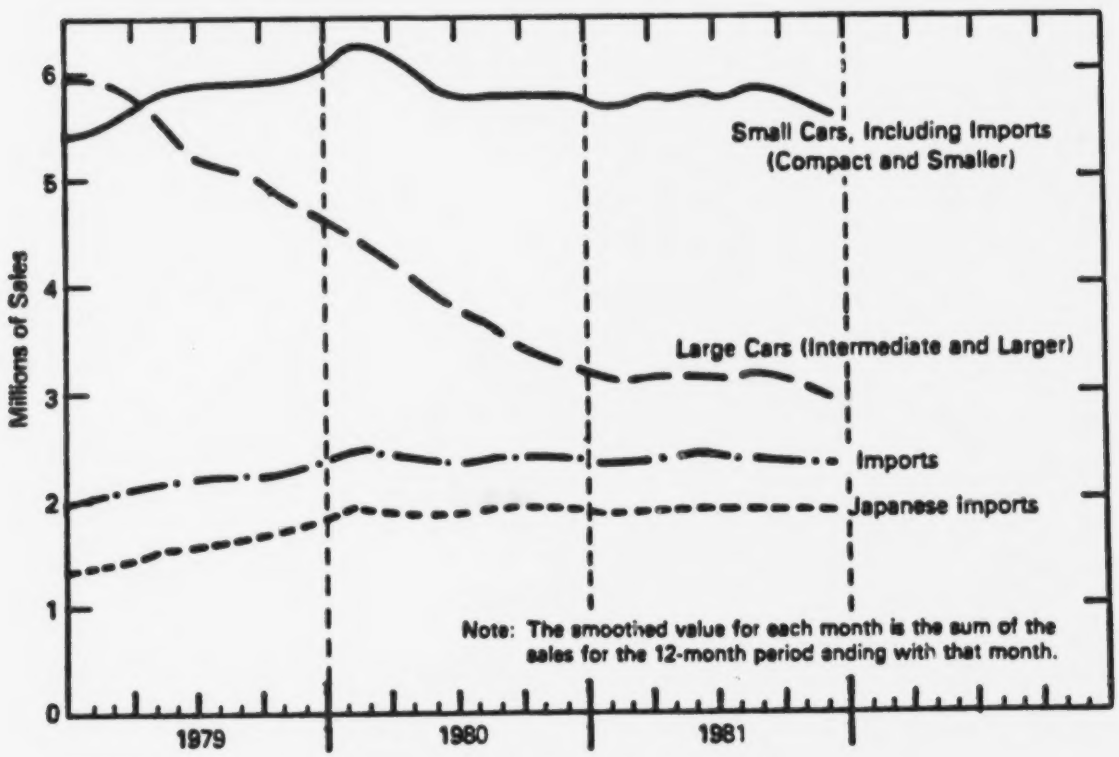

Figure 2 Smoothed Market Segmentation, 1979-1981

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Table II 1981 U.S. Automobile & Light Truck Sales by Manufacturer

(Columns may not add due to rounding)

Country/ Manufacturer	Automobiles				Light Trucks				Total	
	1981 Sales 000	Change from '80 ± %	Share US-Built Market %	Share Total Car Market %	1981 Sales 000	Change from '80 ± %	Share US-Built Market %	Share Total Trucks %	81' Sales Car & Truck 000	Change from '80 ± %
American Motors	137	-8.5	2.2	1.6	63	-18.7	4.0	3.1	200	-12.0
Chrysler	730	+10.6	11.8	8.6	152	-17.1	9.6	7.4	882	+4.6
Ford	1,381	-6.4	22.2	16.2	601	-7.4	37.9	29.6	1,982	-6.7
General Motors	3,797	-7.8	61.1	44.5	733	-5.7	46.2	36.1	4,529	-7.4
Volkswagen of America	162	-8.5	2.6	1.9	34	+32.1	2.1	1.7	196	-3.4
International Harvester	—	—	—	—	4	-81.4	0.2	0.2	4	-81.4
Checker	3	-3.8	.05	.04	—	—	—	—	3	0
U.S. Total	6,209	-5.7	100.0	72.8	1,586	-8.4	100.0	78.1	7,792	-6.2
			Share of Import Market				Share of Import Market			
Toyota	576	-1.0	24.8	6.7	138	+4.6	31.0	6.8	714	+0.2
Nissan (Datsun)	465	-10.1	20.0	5.4	120	+7.6	27.0	5.9	584	-7.0
Honda	371	-1.2	15.9	4.3	—	—	—	—	371	-1.2
Isuzu	18	*	0.8	0.2	10	—	2.2 / 16.1	0.5 / 3.6	27	— / +1.0
GM (Opel) (Luv)	—	—	—	—	62	-30	13.8 / 16.1	3.1 / 3.6	62	-30 / +1.0
Toyo Kogyo (Mazda)	166	+2.8	7.1	1.9	17	+91.5 / -6.3	3.8 / 18.2	0.8 / 4.0	183	+7.3 / -.04
Ford (Courier)	—	—	—	—	64	-17.4 / -6.3	14.4 / 18.2	3.2 / 4.0	64	-17.4 / -.04
Mitsubishi (Chrysler)	111	-14.2	4.8	1.3	34	-46.2	7.6	1.7	145	-24.7
Fuji (Subaru)	152	-6.4	6.5	1.8	—	—	—	—	152	+6.4
Japan Total	1,859	-2.6	80.0	21.8	444	-7.6	100	21.9	2,302	-3.6
Volkswagen	83	-10.1	3.6	1.0	—	—	—	—	83	-10.1
Mercedes Benz	63	+17.0	2.7	0.7	—	—	—	—	63	+17.0
Audi	51	+19.7	2.2	0.6	—	—	—	—	51	+19.7
BMW	42	+12.5	1.8	0.5	—	—	—	—	42	+12.5
Porsche	11	+6.0	0.5	0.1	—	—	—	—	11	+6.0
Ford (Fiesta)	33	-52.1	1.4	0.4	—	—	—	—	33	-52.1
West Germany Total	283	-7.3	12.2	3.3	—	—	—	—	283	-7.3
Volvo	64	+13.3	2.8	0.7	—	—	—	—	64	+13.3
SAAB	15	+7.8	0.6	0.2	—	—	—	—	15	+7.8
Sweden Total	79	+12.2	3.4	0.9	—	—	—	—	79	+12.2
Renault	31	+12.1	1.3	0.4	—	—	—	—	31	+12.1
Peugeot	17	+31.0	0.7	0.2	—	—	—	—	17	+31.0
France Total	48	+18.1	2.1	0.6	—	—	—	—	48	+18.1
Fiat	32	-13.4	1.4	0.4	—	—	—	—	32	-13.4
Lancia	1	-49.1	.04	.01	—	—	—	—	1	-49.1
Alfa Romeo	2	-23.2	.09	.02	—	—	—	—	2	-23.2
Ferarri	1	+16.0	.04	.01	—	—	—	—	1	+16.0
Italy Total	36	-15.3	1.5	0.4	—	—	—	—	36	-15.3
JRT	19	-40.9	0.8	0.2	—	—	—	—	19	-40.9
De Lorean	1	*	.04	.01	—	—	—	—	1	—
England Total	20	-37.8	0.84	0.21	—	—	—	—	20	-37.8
Non Japanese Total	467	-5.0	20	5.5	—	—	—	—	467	-5.0
All Import Total	2,325	-3.1	100	27.2	444	-7.6	100	21.9	2,769	-3.8
All Sales**	8,534	-5.0	—	100	2,030	-8.2	—	100	10,564	-5.6

*Not offered in the U.S. market in 1980

**Medium & Heavy Truck & Bus not included. Sales of these units reported to MVMA totaled 226,405 units, down 16.6% from 1980. Imported truck & Bus sales totaled 1,385 units, down 16.7% from 1980. Not all firms report sales to MVMA.

Light truck sales declined by nearly a half over the 1978-1981 period but the sales pattern was similar to that for cars. The sales decline was confined wholly to the larger conventional truck models while the smaller compact truck actually gained sales volume (Table III). In the case of trucks, however, all of the compact trucks were imported until 1981, so that percent market share for imported trucks increased greatly.

Table III

FOUR-YEAR PASSENGER CAR & LIGHT TRUCK SALES AND MARKET SEGMENTATION

(Million Units)

	1978	1979	1980	1981
Large Domestic Cars	5.7	4.5	3.2	3.0
" Imported Cars	*	*	*	*
Small Domestic Cars	3.4	3.7	3.4	3.2
" Imported Cars	2.0	2.3	2.4	2.3
Subtotal Small Cars	5.4	6.0	5.8	5.5
Total Passenger Cars	11.1	10.5	9.0	8.5
Conventional Domestic Trucks	3.5	2.6	1.7	1.5
" Imported Trucks	*	*	*	*
Compact Domestic Trucks	*	*	*	0.1
" Imported Trucks	0.3	0.5	0.5	0.4
Subtotal Compact Trucks	0.3	0.5	0.5	0.5
Total Light Trucks	3.8	3.2	2.3	2.0
Total Vehicles	15.0	13.8	11.2	10.6

* Less than 50,000 vehicles

World Auto Market

Sales in every major auto market throughout the world were disappointing in 1981 (Table IV). With the possible exceptions of Mexico and Japan, no nation's auto industry met its expectations for production, profit, or employment during 1981 . Plant closings and/or layoffs abounded worldwide. The traditionally weaker firms, such as British Leyland, fared especially badly, but even GM and Ford were among the firms which also had to cut their worldwide operations by dismissing workers and closing factories.

The slump in auto sales was not confined to North America and Europe, but included some of 1980's solid sales areas, such as Brazil. Volkswagen had been very successful in Brazil in recent years, but experienced losses in 1981, as total Brazilian auto sales fell 40 percent in the first seven months of 1981, compared to 1980.

Table IV.

NEW CAR SALES IN SELECTED COUNTRIES, 1980 - 1981

COUNTRY	1980	1981	PERCENTAGE CHANGE
BELGIUM	401,000	350,743	−12.6
FRANCE	1,873,185	1,834,826	− 2.1
ITALY	1,716,435	1,805,724	+ 1.0
JAPAN	2,854,185	2,866,694	+ 1.0
NETHERLANDS	450,076	389,312	−13.6
SWEDEN	192,588	188,522	− 2.2
UNITED KINGDOM	1,785,772	1,484,622	−16.9
UNITED STATES	8,981,040	8,533,785	− 5.0
WEST GERMANY	2,426,187	2,330,335	− 4.0

SOURCE: AUTOMOTIVE NEWS 11/30/81 & 4/27/81
AUTOMOTIVE NEWS, MARKET DATABANK ISSUE, 1981 K.H. Schaeffer & O. Lesueur, Motor Vehicle Market & Prices, U.S. D.O.T. Transportation Systems Center, November 1981.

Factors Influencing the Auto Market

A number of factors appear to have influenced the U.S. auto market over the past three years. It is not possible to separate the effects entirely nor, except in a very general way, to measure the magnitude of each. It seems likely that the factors have varied over time so that at any point the total sales volume and the composition of sales has been the result of a shifting array of forces:

- The rapid rise in gasoline price in the spring of 1979 was a trigger event which frightened some buyers of large cars out of the market and caused others to shift to smaller, more efficient cars.

- The availability of small imported cars, particularly the Japanese cars with a reputation for quality, was a factor in the decline of domestic-built car sales. New-design domestic small cars were in short supply until mid-1980, but thereafter the importance of simple availability decreased and was not a major influence on 1981 sales.

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o The high cost of operating a car, including the purchase price, fuel, maintenance, insurance, and other costs, is causing people to drive less and stretch out the time between new car purchases. "Sticker shock" was the term used to describe the reaction of would-be-buyers to 1981 model list prices. It might appear from Figure 3 that a price increase which merely brought gains in car prices up to the general inflation rate should not be shocking. It must be remembered, however, that many prospective buyers last priced new cars four years ago. The discovery that new models, often smaller and less powerful than the old cars being traded in, carried sticker prices nearly 50 percent higher probably did act to deter sales in many instances.

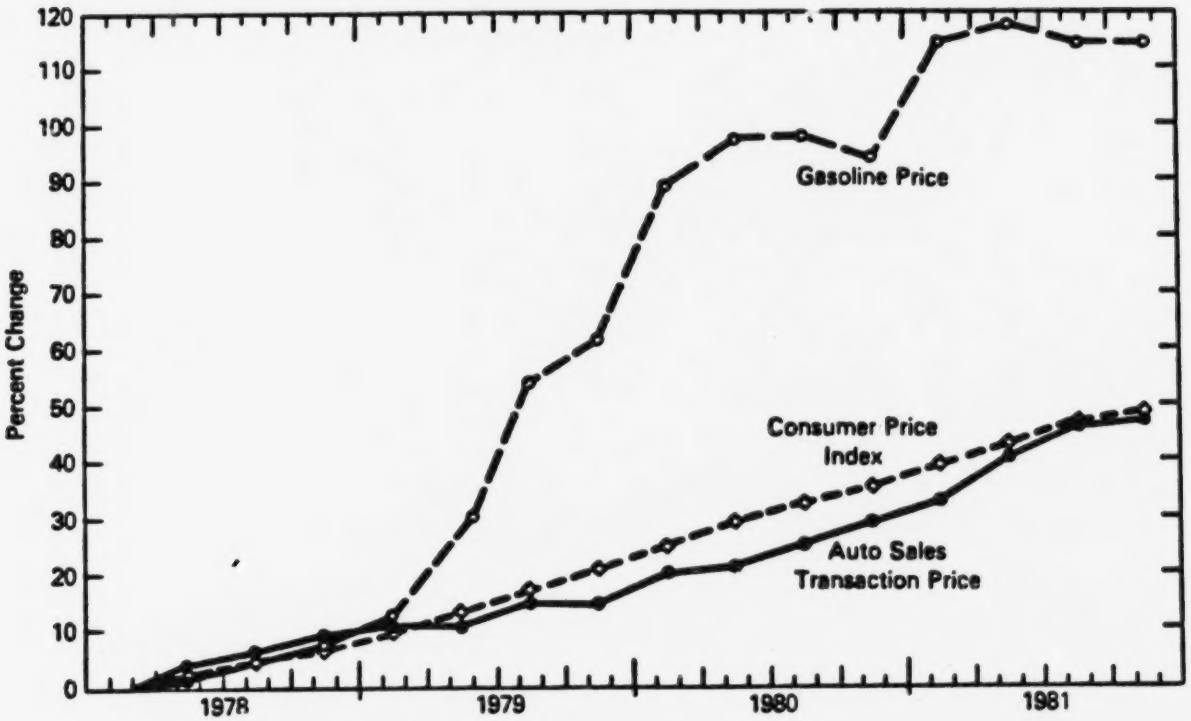

Figure 3 Auto Price & Gasoline Price Change Compared to CPI, 1978—1981. (1st quarter 1978 as base)

Source: U.S. Transportation Systems Center based on U.S. Bureau of Labor Statistics and U.S. Bureau of Economic Analysis data.

o U.S. manufacturer price incentives appear to have been at least partially effective in stimulating sales in 1981 (Figure 4). There is considerable question, however, whether such temporary price action does more than shift sales from one manufacturer to another or from one month to another. There is no indication that the incentives increased total sales for the year. Moreover, year-end incentives by all the domestic manufacturers did not prevent the fourth quarter sales slump. Nevertheless, it appears that the U.S. auto market is sufficiently price sensitive for the market share of a manufacturer to be affected by pricing policy.

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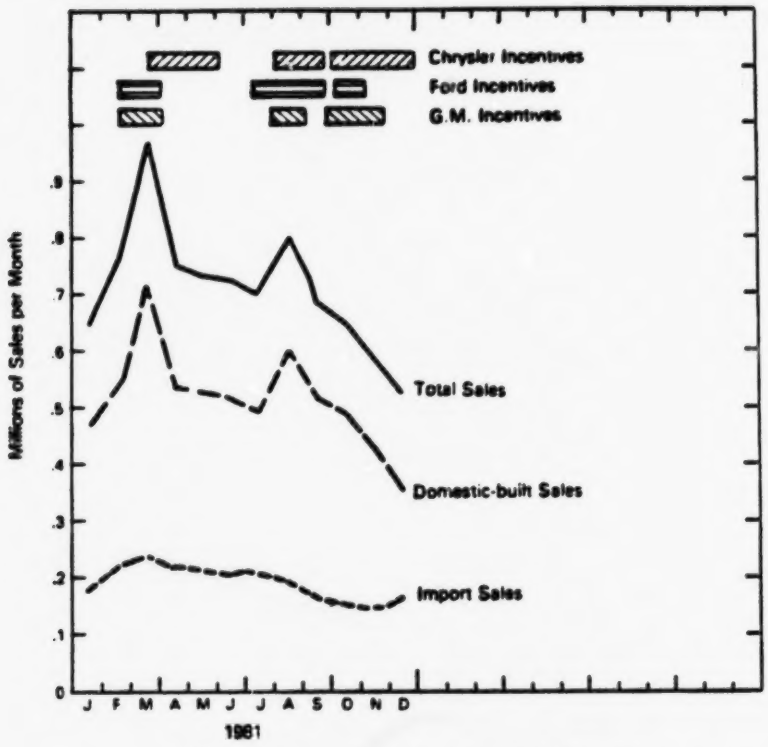

Figure 4 Monthly U.S. Auto Sales Showing Impact of 1981 Price Incentives

- o High interest rates add directly to the cost of auto purchase for the majority of buyers who finance their new car, and indirectly through costs for dealer floorplanning3/ and for manufacturer borrowing. Buyers appear to have been deterred by both the high monthly payment (the average auto financing period was 45 months in 1981) and by the shortage of bank credit as many banks sharply reduced auto loan activity. The auto manufacturers finance subsidaries offered consumer loans, in many cases at rates substantially below the prime as a sales incentive. The manufacturers often paid higher rates on their borrowings then they charged consumers.

  A secondary effect of high U.S. interest rates has been to strengthen the dollar in world markets, raising the effective price of exported U.S. vehicles and parts, and lowering the price of some -- particularly European -- imports.

- o The 1981-82 recession appears to have eroded consumer confidence and been responsible for much of the fourth-quarter 1981 sales decline. The automobile, although a transportation necessity for many Americans,

3/ The term "floorplanning" is used by dealers to describe the financing of their inventory of new vehicles for sale, both on the showroom floor and in storage lots.

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is a major purchase which can often be deferred. Historically, most new car purchases involve the trading-in of a car in fair-to-good running condition. The would-be new car buyer thus usually has the option of keeping the old car running.

In times of economic uncertainties, many people choose to avoid the expense and long-term obligation of new car financing. Auto sales are closely linked to the national economy (Figure 5) and it appears that the market will remain depressed until the economy recovers.

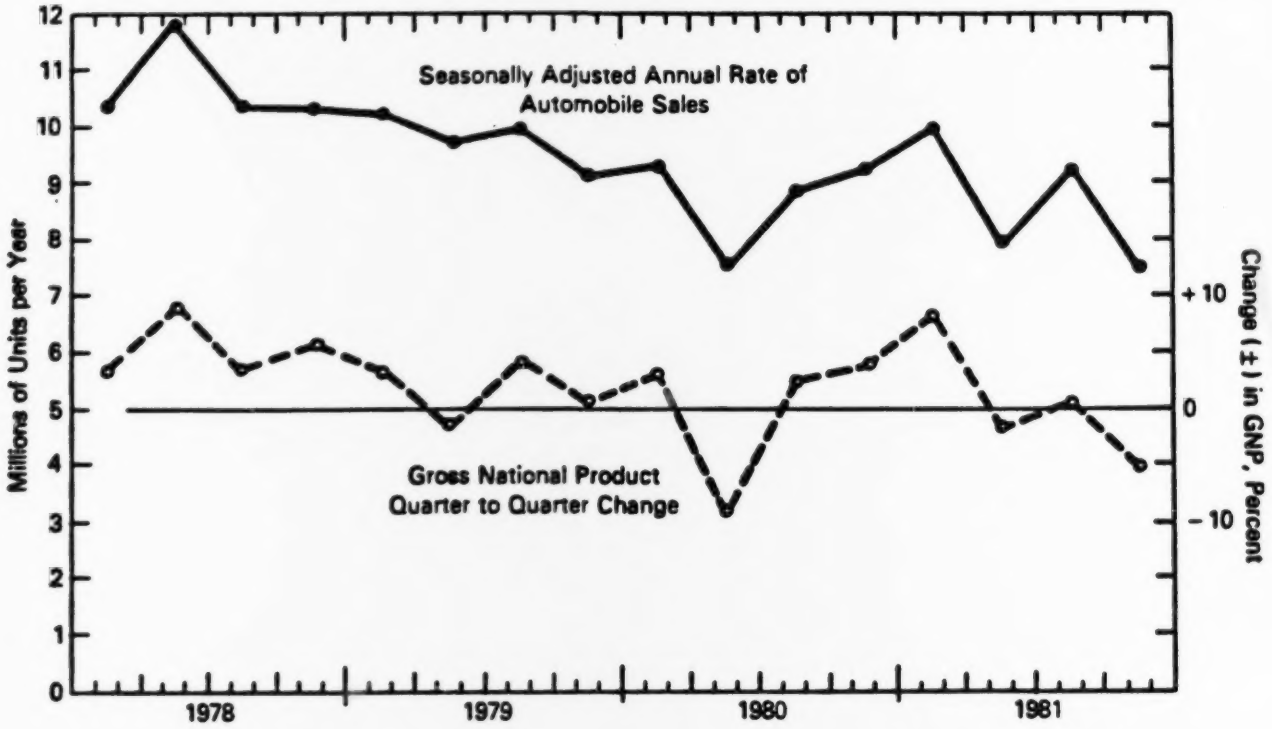

Figure 5 **Correspondence Between Auto Sales and Gross National Product.**

Source: U.S. Transportation Systems Center based on MVMA and U.S. Bureau of Economic Analysis data.

The Impacts of the Japanese Cost Advantage

U.S. Market Impacts - During 1981 the Japanese manufacturers continued to enjoy a substantial advantage over the U.S. industry in their cost to produce a subcompact car. In the 1980 DOT report, the advantage was estimated at $1,000 to $1,500, based on preliminary studies. Later work, such as that illustrated by Table V, indicates that a range of $1,500 to $2,000 (in 1981 dollars) for a typical 1981 subcompact car would be more nearly correct. The overall cost advantage comes from the Japanese supplier network as well as the prime manufacturers and some advantage might be attributed to the favorable tax and antitrust treatment that fosters the prime-supplier relationship. The actual advantage, of course, varies from manufacturer to manufacturer and from model to model. The real significance of the Japanese cost advantage lies not in the precise amount, but in the way it affects the U.S. market.

Table V

SUMMARY OF JAPANESE PRODUCTION COST ADVANTAGE FOR A TYPICAL SUB-COMPACT CAR

TECHNOLOGY	= $ 73	
		Subtotal = $ 73
MANAGEMENT SYSTEMS AND TECHNIQUES 1/		
Quality Control Systems o manpower o scrap o warranty savings	= 329	
Just-In-Time Production o smaller plants o plant complexes o fewer people o utility savings o interest savings o in-bound freight savings	= 550	
Material Handling Engineering	= 41	
Other Productivity Improvements o quality circles o job classification	= 478	
		Subtotal = $1,398
UNION MANAGEMENT RELATIONS		
Absenteeism (unscheduled) (6-8% U.S. vs. 2% JAPAN)	= 81	
Relief Systems and Allowances	= 89	
Union Representatives	= 12	
		Subtotal = $ 182
WAGE AND FRINGE RATES (Total hours Japan X Difference in Weighted Average Wage Rate)	= 550	
		Subtotal = $ 550
Total manufacturing cost advantage		TOTAL = $2,203
JAPANESE OCEAN FREIGHT, DUTY, AND PORT COST		= $ (485)
NET JAPANESE LANDED COST ADVANTAGE		NET = $1,718

SOURCE: "Analysis of Japanese Landed Cost Advantage for the Manufacture of Sub-Compact Cars" Copyright 1982. Harbour and Associates, Inc., Berkley, Michigan. Reprinted by permission.

1/ See Chapter III, pages 76 to 83 for a description of these techniques.

So far it appears that the Japanese manufacturers have not chosen to pass on all of their cost savings to the U.S. consumer, and in the process, further increase their sales and market share. Rather, they have used the knowledge that they can underprice competing U.S. models if necessary and still enjoy handsome profits to set prices for their own profit. The U.S. manufacturers have thus been restricted in their own pricing options and have been able to maintain market share only by reducing revenue. In part, the need for borrowing by the U.S. industry (discussed in the next section) was increased by this revenue loss.

The Japanese voluntary export restraint, announced in April of 1981, was implemented in the face of this situation. The restraint was intended to offset, in part, the Japanese strong position in the U.S. market and to give the U.S. industry breathing room to catch up in plant and product line conversions. In the sluggish 1981 auto market, the U.S. manufacturers were unable to take advantage of the Japanese restraint by expanding their own market. Rather, the Japanese, by keeping their sales volume close to the restraint level while the rest of the market dropped, were able to gain in market share. They also increased the average value of the cars sold over the period as well.

The greatest importance of the Japanese production cost advantage lies not with the impact on past sales, but with the potential for impact on future sales. The fact that a group of competitors, which already has a reputation for product quality, also has the potential for substantial price reductions places a serious restriction on the ability of the U.S. manufacturers either to expand their domestic market share or to increase exports to the world market. As long as the Japanese maintain a significant cost advantage, they can be the price leaders in world auto sales.

Overseas Response - Recognition of Japan's extreme competitiveness, combined with the slump in auto sales, profits, and employment, has encouraged protectionist pressures throughout the world over the last several years. Domestic auto producers in nations with relatively low barriers to auto trade, such as the U.S., Belgium and the Netherlands, have called for trade barriers as Japanese penetration continued to increase through 1980 and into 1981. Countries such as Italy and France, that have long had severe annual restraints against Japanese auto imports joined the call for European Economic Community (EEC) trade barriers that would go beyond the common 10.9 percent tariff. These nations were concerned about losses to the Japanese in exports to other EEC nations, and the possible entry to their own home markets via Japanese production within the EEC. Even West Germany, which is more trade-dependent than any other European nation and which nearly equalled Japan in 1980 by exporting 53 percent of its auto production, felt strong pressure to slow the Japanese auto export surge.

The resistence to imposition of new trade barriers was helped partly by the Japanese recognition that some self-restraint in exports would be in their own long-term interest. In Europe, the EEC, which in 1980 itself exported a million autos, introduced a formal monitoring program for

Japanese auto imports, while leaving it to the individual member nations to work out bilateral arrangements with the Japanese. Existing restraints were more strictly enforced, but not changed, in the U.K. (10 percent share), Italy (2,200 units), and France (3 percent share). Japan informally agreed to a limit to annual sales growth in the West German market of 10 percent, while Belgium and the Netherlands negotiated more limiting arrangements. Nations elsewhere, in Africa, South America, Asia and the Pacific, have tended more toward protectionism with higher trade barriers and local content requirements.

Effect of Exchange Rates - Exchange rate changes during 1981 have altered the Japanese cost advantage. The pattern of change in currency values shown in Figure 6 means that each dollar paid for a Japanese car bought in the U.S. in mid-1981 would convert to roughly 16 percent more yen than it would have in January of that year. While the yen has appreciated since mid-year, the index at the end of 1981 was still 10 percent below January. Since the Japanese manufacturers neither lowered their dollar prices for cars marketed in the U.S., nor raised their worker's wages and other internal yen payments to compensate for the currency shift, a portion of the added yen income has gone to increase their profit.

The currency value shifts have tended to reduce the Japanese cost advantage relative to Germany, France and the United Kingdom. The cost advantage, however, is still substantial and the Japanese have been willing to use it to compete in price in the European markets.

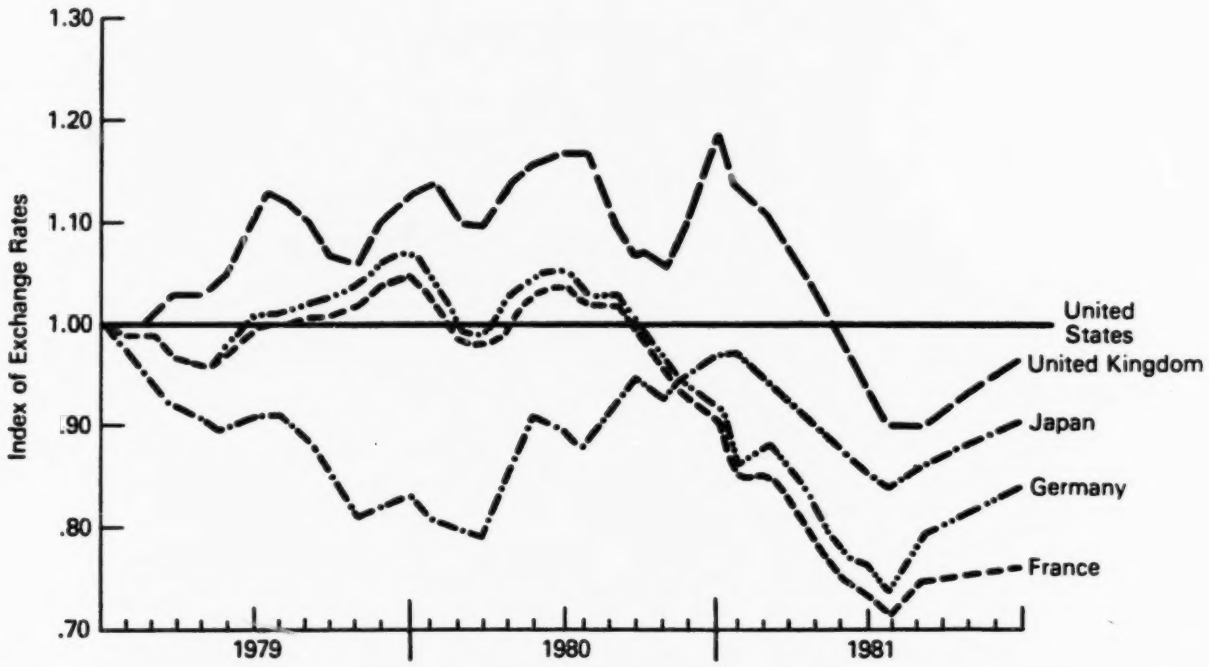

Figure 6 Foreign Currency Values Relative to the Dollar, 1979—1981

Source: Smith Barney & Co. as Compiled by Leon Rudman, T.S.C.

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Financial Performance

In 1981, the U.S. automobile industry as a whole suffered a net loss of $1.3 billion, although managing to invest $13.2 billion in tooling and plant improvement through the year. It is noteworthy that while 1981 domestic car and light truck sales volume was 6.2 percent worse than 1980, the net loss reported was only a third of that suffered the previous year. The measures the auto manufacturers employed to reduce losses and to generate funds for investment constitute the principal financial activities of interest during the year.1/

Capital Investments

From the 1973 oil embargo, the domestic motor vehicle manufacturers recognized the requirement to change over their domestic production facilities to the production of smaller, more fuel economical cars and trucks. The projected cost of the required plant and tooling to keep the domestic manufacturers in operation, rebuild the domestic physical plant to produce fuel-economical smaller cars and trucks, and to remain competitive overseas has been variously estimated to be in the range from $75 to $100 billion for the period from 1978 through the mid-1980's. Over the past four years, as shown in Table VI, the big four2/ have made worldwide capital investments of over $40 billion; thus, roughly one-half of the originally planned investment program has been completed.

Table VI

1978/1981 WORLDWIDE PLANT/TOOLING EXPENDITURES FOR THE BIG FOUR 1/

($ Billions)

	1978	1979	1980	1981
General Motors	4.8	5.9	7.8	10.1
Ford	2.4	3.8	2.8	2.4
Chrysler	0.7	0.7	0.8	0.5
AMC	0.1	0.1	0.2	0.2
Total	8.0	10.5	11.6	13.2

1/ Includes unconsolidated subsidiaries and other investments.

1/ Except as otherwise noted, all financial data presented in this section are compiled by TSC from manufacturers' reports.

2/ Many analysts recognize five major manufacturers of automobiles in the U.S.: General Motors, Ford, Chrysler, American Motors and, most recently, Volkswagen of America (VWOA). The term "big four" refers to the first four of the above; VWOA is a subsidiary of the West German Volkswagen firm and separate financial data for the U.S. operations are not available. VWOA appears to be encountering most of the same problems as the U.S.-owned firms.

Operating Costs

Total worldwide sales of the big four domestic manufacturers have fallen by 6 million units since 1978, with 4.4 million units of the decline being in the U.S. market. Faced with those sales losses the industry has reduced operations to about 60 to 70 percent of 1978 volume in attempts to reduce costs. There is considerable delay involved in reducing costs so drastically, however, and there are also losses in economies of scale involved. As a result, in 1980 the funds generated by industrywide operations fell to $2.7 billion, from $8.4 billion in 1979 (Table VII). With allowances for depreciation and amortization plus taxes, the industry reported a net 1980 loss of $4.2 billion.

Table VII

INCOME AND COSTS SUMMARY FOR THE BIG FOUR MANUFACTURERS

		1978	1979	1980	1981
Worldwide Vehicle Sales	(Millions of Units)	18.7	17.1	13.0	12.7
Revenues from Sales	($ Billions)	122.3	125.0	106.6	114.3
Operating Costs[1/]	"	108.6	115.0	104.6	108.3
Gross Margin of Revenue Over Operating Costs	"	13.7	10.0	2.0	6.0
Depreciation & Amortization	"	4.8	5.3	6.9	7.2
Before-Tax Income (loss)	"	8.9	4.7	(4.9)	(1.2)
Net Reported After-Tax Profit (loss)	"	4.9	3.1	(4.2)	(1.3)
Net Funds Generated By Operations [2/]	"	9.7	8.4	2.7	5.7

1/ Includes all manufacturing costs such as wages, salaries, materials and purchased parts plus plant overhead, corporate expenses, interest expense, sales, general and administrative expense. Does not include taxes or the write-off for depreciation and amortization.

2/ Equal to the sum of Net Profit plus the write-off for Depreciation & Amortization.

The measures taken by the manufacturers to reduce costs were stringent, and included plant closings, consolidations of operations, layoffs of blue and white collar personnel, shortening of supply lines to reduce transportation costs, and implemention of productivity-improvement techniques. Those measures took hold in 1981 and, despite further declines in sales, funds generated by operations rose to $5.7 billion. With allowances for depreciation and amortization and for taxes, the net reported loss for 1981 declined to $1.3 billion. All of the manufacturers improved their net income: Ford, Chrysler and AMC reduced their losses, and GM reported a profit.

As can be seen in Table VIII, one of the critical factors in the improvement was that, while revenue per vehicle sold increased by 9.8 percent (close to the inflation rate), the manufacturers were able to hold the increase in cost of the average vehicle sold to only 6.0 percent. As a result, funds generated by operations increased from an average of $208 per unit in 1980 to $449 per unit in 1981. The 1981 industrywide improvement in cost control is made apparent by contrasting these results to the previous year, when revenue per unit went up 12.2 percent but costs rose 19.6 percent.

Table VIII

UNIT REVENUE AND COSTS FOR THE BIG FOUR MANUFACTURERS

		1978	1979	1980	1981
Revenue Per Unit Sold	$	6540	7310	8200	9000
Percent Change			11.8	12.2	9.8
Cost Per Unit Produced		5807	6725	8046	8528
Percent Change	$		15.8	19.6	6.0

Sources and Uses of Funds

Corporate funds available from operations essentially consist of sales revenues less actual operating costs, plus any income from sources other than sales, less any interest and taxes paid.3/ As shown in Table IX the big four manufacturers generated net funds from operations totalling $26.5 billion from 1978 through 1981. These funds were applied toward investments in new plant and tooling ($43.3 billion) and toward the payment of dividends ($6.2 billion). While annual dividends decreased from $2.2 billion in 1978 to $0.8 billion in 1981 (of which $0.7 billion was paid by General Motors), the expenditures for plants and tooling increased from $8.0 billion to $13.1 billion. Because these increasing expenditures occurred in a period of decreasing sales and limited income, there was a shortfall in funds generated by operations, ranging from $0.5 billion in 1978 4/ to $8.3 billion in 1981. The shortfall totaled $23.0 billion during the four-year period.

3/ Funds available from operations can be calculated from reported net income (or loss) by adding to it the allowances for depreciation and amortization, since these allowances are not actual expenditures but rather allocations for accounting and tax purposes to account for the depletion of the economic life of plant and equipment.

4/ In 1978, GM, Ford and AMC all reported net profits and were able to follow the industry tradition of internal financing of plant and tooling investment. Chrysler, however, reported a net loss for the year and made expenditures for plant and tooling well in excess of funds generated from operations. The Chrysler shortfall accounted for the industry shortfall in what was, for the industry as a whole, a profitable year.

Table IX

SOURCES AND USES OF FUNDS FOR THE BIG FOUR MANUFACTURERS

($ Billions)

	1978	1979	1980	1981	Total 1978-1981
NET FUNDS GENERATED BY OPERATIONS	9.7	8.4	2.7	5.7	26.5
USE OF FUNDS					
PLANT & TOOLING INVESTMENT	8.0	10.5	11.6	13.2	43.3
DIVIDENDS DISTRIBUTED	2.2	2.0	1.2	0.8	6.2
TOTAL EXPENDITURES	10.2	12.5	12.8	14.0	49.5
OPERATING FUNDS EXCESS (SHORTFALL)	(0.5)	(4.1)	(10.1)	(8.3)	(23.0)
FINANCIAL ADJUSTMENTS					
LONG TERM DEBT INCREASE (DECREASE)	(0.2)	(0.2)	3.3	2.3	5.2
STOCK ISSUED	0.4	0.2	0.8	1.2	2.5
WORKING CAPITAL DECREASE (INCREASE)	(0.4)	3.1	5.5	2.1	10.3
OTHER LIABILITY INCREASE (DECREASE)	0.8	1.1	0.5	2.7	5.1
FUNDS FROM ADJUSTMENTS	0.5	4.1	10.1	8.3	23.0

The $23.0 billion shortfall in funds generated by operations was offset by increases in long-term debt and other long-term liabilities, draw-downs of working capital, and sales of equity. In 1981, for example, the $8.3 billion shortfall in funds from operations was offset by a $2.3 billion increase in long-term debt, the issuance of $1.2 billion in stock, a $2.1 billion decrease in working capital, and a $2.7 billion increase in other liabilities. (In addition, the manufacturers gained $.2 billion in cash from "Safe-Harbor" sales and leaseback of equipment, and about $.4 billion from outright sales of unessential capital assets.)

The big four manufacturers tended to show similar financial patterns over the past four years (Table X). In general, they experienced:

- o sharp reductions in sales, but a modest recovery in revenues in 1981;
- o increasing shortfalls in funds from operations through 1980, but improvements in 1981, indicating successes in reducing costs;
- o buildups of long-term debt and other liabilities to finance plant and tooling investments.

Chrysler had the earliest difficulties, showing a net loss in 1978. Chrysler also showed the most recovery in 1981, however, actually improving sales and paying off some long term debt.5/ The other three of the big four did not post a net loss until 1980. However, starting in 1979 GM and Ford both began to increase their indebtedness in order to invest more than was being generated from operations. AMC's borrowings were principally in 1981 but it also received funds from its new overseas partner, Renault, in 1980 and 1981.

Financial Condition

By the end of 1981, the events discussed above resulted in significant changes in the industry's financial condition. As measured through analysis of a composite balance sheet (Table XI), long-term debt and other long-term liabilities both more than doubled, and a reduction occurred in working capital.

Table XI

BALANCE SHEET ACCOUNTS FOR THE BIG THREE MANUFACTURERS 1/

($ Billions)

	1978	1979	1980	1981
Current Assets	34.7	32.1	30.5	27.1
Current Liabilities	22.4	22.9	26.8	25.3
Working Capital	12.3	9.2	3.7	1.8
Long Term Debt	3.4	3.3	6.6	8.9
Other Long Term Liabilities 2/	4.2	5.2	5.6	8.8

1/ Excludes AMC

2/ Includes Deferred Credits, Capitalized Leases and Deferred Employee Benefits.

5/ As part of the agreements for the federally guaranteed loans, some of Chrysler's creditors accepted preferred stock and reduced cash in lieu of repayment of outstanding debt. In 1981 and early in 1982 Chrysler settled all remaining long-term, non-guaranteed bank indebtedness.

Table X

Financial Summaries by Manufacturer

Plant & Tooling includes unconsolidated subsidiaries and other investments

Columns may not add due to rounding

GENERAL MOTORS

		1978	1979	1980	1981
OPERATIONS					
SALES	(millions of units)	9.5	9.0	7.1	6.7
GROSS REVENUE	($ billions)	63.2	66.3	57.7	62.7
NET AFTER TAX INCOME	"	3.5	2.9	(0.8)	0.3
NET FUNDS GENERATED BY OPERATIONS	"	6.5	6.1	3.4	4.7
USE OF FUNDS					
PLANT & TOOLING INVESTMENT	"	4.8	5.9	7.8	10.1
DIVIDENDS DISTRIBUTED	"	1.7	1.5	0.9	0.7
TOTAL EXPENDITURES	"	6.5	7.4	8.7	10.8
OPERATING FUNDS EXCESS (SHORTFALL)	"	--	(1.3)	(5.3)	(6.1)
FINANCIAL ADJUSTMENTS					
LONG TERM DEBT INCREASE (DECREASE)	"	(0.1)	(0.1)	1.0	1.9
STOCK ISSUED	"	--	0.2	0.3	0.3
WORKING CAPITAL DECREASE (INCREASE)	"	(0.3)	1.2	3.5	2.1
OTHER LIABILITY INCREASE (DECREASE)	"	0.4	--	0.5	1.8
FUNDS FROM ADJUSTMENTS		--	1.3	5.3	6.1

FORD

		1978	1979	1980	1981
OPERATIONS					
SALES	(millions of units)	6.6	5.9	4.4	4.4
GROSS REVENUE	($ billions)	42.8	43.5	37.1	38.2
NET AFTER TAX INCOME	"	1.6	1.2	(1.5)	(1.1)
NET FUNDS GENERATED BY OPERATIONS	"	2.9	2.8	0.5	1.1
USE OF FUNDS					
PLANT & TOOLING INVESTMENT	"	2.4	3.8	2.8	2.4
DIVIDENDS DISTRIBUTED	"	0.4	0.5	0.3	0.1
TOTAL EXPENDITURES	"	2.8	4.3	3.1	2.5
OPERATING FUNDS EXCESS (SHORTFALL)	"	0.1	(1.5)	(2.6)	(1.4)
FINANCIAL ADJUSTMENTS					
LONG TERM DEBT INCREASE (DECREASE)	"	(0.2)	0.1	0.8	0.6
STOCK ISSUED	"	0.1	--	--	--
WORKING CAPITAL DECREASE (INCREASE)	"	(0.1)	0.8	1.8	0.3
OTHER LIABILITY INCREASE (DECREASE)	"	0.3	0.6	--	0.5
FUNDS FROM ADJUSTMENTS		(0.1)	1.5	2.6	1.4

AMERICAN MOTORS

		1978	1979	1980	1981
OPERATIONS					
SALES	(millions of units)	0.395	0.418	0.328	0.311
GROSS REVENUE	($ billions)	2.6	3.2	2.6	2.6
NET AFTER TAX INCOME	"	0.02	0.07	(0.20)	(0.14)
NET FUNDS GENERATED BY OPERATIONS	"	0.08	0.12	(0.15)	(0.0897)
USE OF FUNDS					
PLANT & TOOLING INVESTMENT	"	0.06	0.09	0.145	0.186
DIVIDENDS DISTRIBUTED	"	--	0.005	0.002	--
TOTAL EXPENDITURES	"	0.06	0.095	0.147	0.186
OPERATING FUNDS EXCESS (SHORTFALL)	"	0.02	0.025	(0.30)	(0.27)
FINANCIAL ADJUSTMENTS					
LONG TERM DEBT INCREASE (DECREASE)	"	--	0.02	--	0.16
STOCK ISSUED	"	--	--	0.17	0.05
WORKING CAPITAL DECREASE (INCREASE)	"	0.05	(0.14)	0.11	0.03
OTHER LIABILITY INCREASE (DECREASE)	"	(0.07)	0.092	0.02	0.012
FUNDS FROM ADJUSTMENTS		(0.02)	(0.028)	0.30	0.25

CHRYSLER

		1978	1979	1980	1981
OPERATIONS					
SALES	(millions of units)	2.2	1.8	1.2	1.3
GROSS REVENUE	($ billions)	13.6	12.0	9.2	10.8
NET AFTER TAX INCOME	"	(0.2)	(1.1)	(1.7)	(0.5)
NET FUNDS GENERATED BY OPERATIONS	"	0.2	0.7	1.1	--
USE OF FUNDS					
PLANT & TOOLING INVESTMENT	"	0.7	0.7	0.7	0.5
DIVIDENDS DISTRIBUTED	"	0.1	--	--	--
TOTAL EXPENDITURES	"	0.8	0.7	0.7	0.5
OPERATING FUNDS EXCESS (SHORTFALL)	"	(0.6)	(1.4)	(1.9)	(0.5)
FINANCIAL ADJUSTMENTS					
LONG TERM DEBT INCREASE (DECREASE)	"	0.1	(0.2)	1.5	(0.4)
STOCK ISSUED	"	0.3	--	0.3	0.8
WORKING CAPITAL DECREASE (INCREASE)	"	--	1.2	0.1	(0.3)
OTHER LIABILITY INCREASE (DECREASE)	"	0.2	0.4	--	0.4
FUNDS FROM ADJUSTMENTS		0.6	1.4	1.9	0.5

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Much of the reduction in working capital represents a decrease in in-process inventory, in part because lower production levels require smaller inventories and in part because of actions directed at reducing inventory costs. In addition, the industry has increased its accounts payable since 1978, often by delaying payments to suppliers but also by increasing purchased components and services.

Two commonly used determinants of a corporation's -- or an industry's -- financial condition are its liquidity and its leverage.

Liquidity essentially indicates the capability of a firm to meet its current and near-term obligations from cash and readily disposable assets on hand. It is often measured by the "current ratio" which is calculated by dividing current assets by current liabilities. Another measure, the "quick" or "acid test" ratio, considers just the resources immediately available (cash plus short-term investments plus accounts receivable, divided by current liabilities).

As can be seen from Table XII, for the industry as a whole, both liquidity ratios declined between 1978 and 1981. At the end of 1981, the current ratio was down to a level of 1.1, which provides a low safety margin. The quick ratio was at 0.5 compared to a "normal" quick ratio of 1.00. Among the big three auto manufacturers, Chrysler hit its low point in both liquidity ratios in 1980 and actually improved its position in 1981. Ford had a below average quick ratio in 1978 but its position deteriorated only slightly over the period so that in 1981, it had the best cash position. GM, which had good liquidity in 1978, had seen that condition deteriorate markedly by 1981.

Leverage indicates the degree to which a firm's total capitalization depends on borrowing as opposed to financing from earnings or ownership investment by stockholders. It is commonly measured by the calculation of a "debt-to-equity" ratio. While industries with stable cash flow are often more highly leveraged, the cyclic nature of the automotive market has made internal financing traditional in the automobile industry and manufacturers have heretofore maintained a low debt-to-equity ratio.

The debt-equity ratio for the big three more than doubled over the 1978-1981 period. GM, which began the period with a raio of 0.1, saw it rise to 0.24, while Ford's ratio rose from 0.17 to 0.40. Chrysler, which in 1978 already had a debt/equity ratio of 0.33, was forced to resort to massive borrowing in 1979 and 1980, bringing its ratio above 0.80. As noted earlier, in 1981 Chrysler reorganized its debt to make its standing slightly better. Ford and GM borrowed heavily in 1980 and again in 1981. The heavy 1981 debt position of all the manufacturers makes it difficult for them to continue borrowing on the same scale as in 1980-81 to finance 1982 plant and tooling investments. It should also be noted that the industry's annual interest cost is now in excess of $2 billion or an average of $163 per vehicle sold worldwide. For the heavily indebted Chrysler, annual interest costs per vehicle are over $300.

Another important and commonly used indication of a firm's financial health is the degree to which earnings provide for the payment of interest expenses. Not only are stockholders concerned with the reduction in net earnings, but

Table XII

FINANCIAL RATIOS FOR THE AUTO INDUSTRY

		1978	1979	1980	1981
Liquidity					
"Current Ratio" = Current Assets / Current Liabilities					
	GM	1.8	1.7	1.3	1.1
	Ford	1.3	1.3	1.1	1.0
	Chrysler	1.4	1.0	0.9	1.1
	Industry	1.6	1.4	1.1	1.1
"Quick Ratio" = (Cash Plus Short-Term Investments Plus Accounts Receivable) / Current Liabilities					
	GM	1.0	0.9	0.7	0.5
	Ford	0.7	0.6	0.6	0.6
	Chrysler	0.6	0.4	0.3	0.4
	Industry	0.9	0.7	0.6	0.5
Leverage					
"Debt/Equity Ratio" = Debt (Short & Long-Term) / Debt Plus Equity					
	GM	0.10	0.08	0.17	0.24
	Ford	0.17	0.19	0.36	0.40
	Chrysler	0.33	0.50	0.84	0.80
	Industry	0.15	0.17	0.29	0.33

creditors and potential lenders are interested in the extent to which conditions might affect the firm's ability to continue interest payments. A firm in default on interest can be brought to bankruptcy. One measure of this relationship is the "interest coverage ratio" (earnings after all expenses but interest have been paid divided by interest expense). A ratio of 5 or above is normally considered to be healthy. At a ratio of 2, the earnings left after paying interest will be only as large as the interest expense. At a ratio of 1, paying interest would absorb all the earnings, leaving no profit for the shareholders.

A negative ratio, as Table XIII shows the auto industry had in 1981, should not be taken to mean that a firm, or in this case an industry, had insufficient funds to pay its interest expense. The measurement is based on financial data presented according to sound accounting practice and depreciation and amortization have been treated as deductions from income. As explained earlier, the actual funds generated by operations do not include real expenditures for those items and are thus larger than the reported income (or loss). As with all accounting-based data, the measurement is relevant to considering a firm's long-run financial strength. A firm cannot continue to operate indefinitely if it is using funds to pay interest expenses (or other expenses) that would otherwise go to capital investment for replacement of plant and equipment and for expansion.

Table XIII

COMPARISON OF INTEREST COVERAGE FOR THE MANUFACTURING SECTOR

(End of Year - 1981)

Petroleum	5.55
Steel	2.62
Tires	2.4
Autos	-1.30

Source: Karen W. Arenson, "Riding Out the Recession: Corporations in a Financial Marathon," N.Y. Times, p. D1, March 15, 1982, New York, N.Y.

Employment and Community Impact

As of the last week in December, an estimated 279,400 auto workers were on layoff.1/ Of these, 66,850 were on temporary layoff, principally for inventory adjustment, but 212,550 were on indefinite layoff -- long-term furlough with no definite date set for recall. Employees on temporary layoff are carried on company books and are included in employment figures for the company and the industry. The total number on temporary layoff will fluctuate from week to week and may not represent the same workers each week. Over the year, the average number on temporary layoff was about 37,000, but the high for the year was 90,680 in the week of August 3 while the low was 425 in the week of April 13.

Workers on indefinite layoff are not carried as part of the companies' employment total although whether or not they are included in State or national unemployment data depends on whether or not they are listed with State employment services as actively seeking another job. Those very recently laid off may not yet be counted and those who have been unemployed a long time and grown discouraged or moved out of the area will not be included. The average number of workers on indefinite layoff in 1981 was about 174,400 but the low was 152,475 in the week of August 3 while the high occurred at year end (212,550). Both temporary and indefinite unemployment were rising at year's end.2/ The 1981 trend for auto industry unemployment is shown in Table XIV.

Table XIV

U.S. AUTO LAYOFFS IN 1981

	INDEFINITE	TEMPORARY	TOTAL
January	193,625	49,970	243,595
February	195,550	45,710	241,260
March	187,075	15,210	202,285
April	176,890	11,095	187,985
May	164,140	6,555	170,695
June	157,690	7,510	165,200
July	152,970	55,000	207,970
August	156,160	68,660	224,820
September	160,075	52,770	212,845
October	168,270	29,400	197,670
November	175,830	40,895	216,725
December	205,000	62,000	267,000
Average	174,462	37,065	211,527

1/ Ward's Automotive Report, Dec. 28, 1981

2/ In the first quarter of 1982, indefinite unemployment reached a new high of 252,283 in the week of March 22. Temporary unemployment was at its highest in the week of January 4, 1982 with 123,200 on layoff.

Auto industry employment peaked in 1978 (Figure 7) and declined more or less steadily in 1979, 1980 and 1981. Three-quarters of the auto-related employment is concentrated in seven states (Table XV). From 1978 through 1981, 20 prime manufacturer plants were closed in these states. In response to the economic displacements occurring in states with heavy auto industry employment, the Economic Development Administration (EDA) of the Department of Commerce initiated the Automotive Community Adjustment Program (ACAP). The program gave planning adjustment assistance grants to twenty designated recipients.3/ The grants were designed to allow communities to develop a strategy for local economic readjustment in the wake of the major economic displacements related to the auto industry downturn.

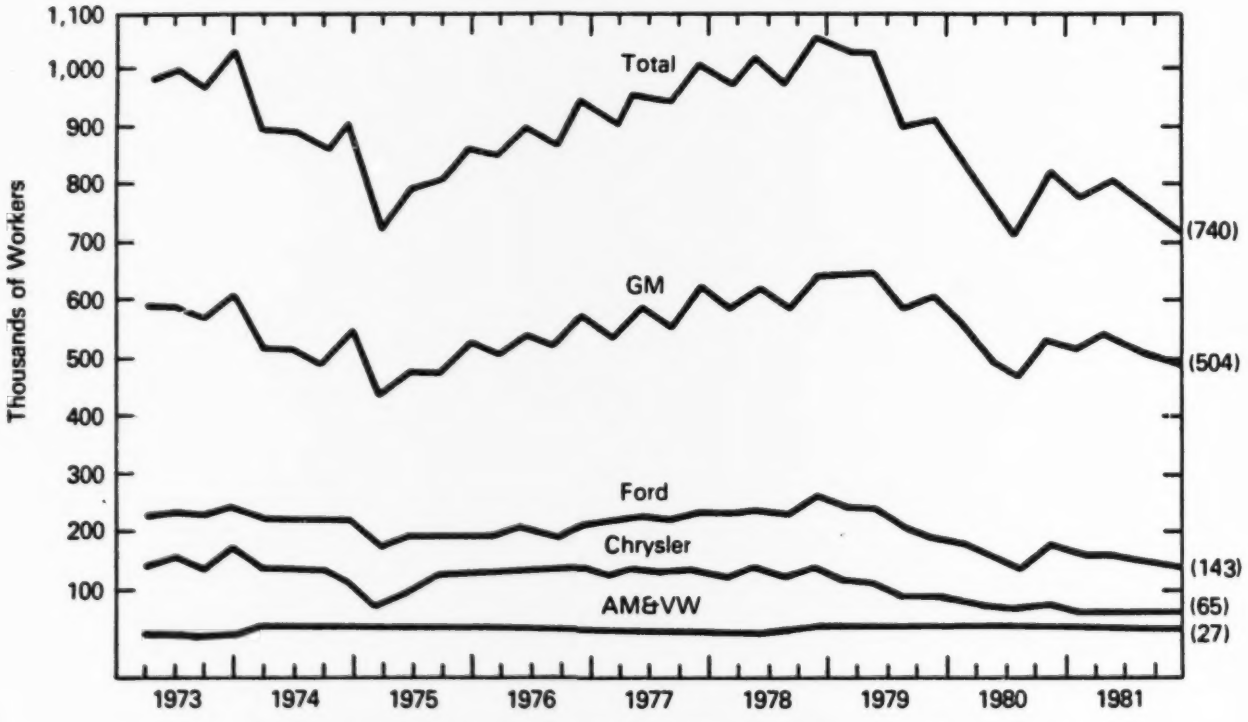

Figure 7 Employment by U.S. Auto Manufacturers Since 1973.

3/ The recipients were: Michigan: the State of Michigan, Detroit, Wayne County, Saginaw and Flint. Ohio: the State of Ohio, Cleveland, Akron, Dayton and Toledo. Indiana: Elkhart, Anderson, Kokomo, and Gary, Illinois: Rockford. Wisconsin: Racine/Kenosha. Missouri: St. Louis and Kansas City.

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Table XV

CONCENTRATION OF
MOTOR VEHICLE MANUFACTURING RELATED PLANTS AND
EMPLOYMENT FOR THE FIVE PRIME MANUFACTURERS[1/]

	NUMBER OF PLANTS		EMPLOYMENT[2/]			YEARLY AVERAGE STATE UNEMPLOYMENT RATE		
	PLANTS (1978)	CLOSED SINCE 1978	1978/ 1979	1981 (Est.)	CHANGE SINCE 1978/79	1979	1980	1981
MICHIGAN	131	12	365,000	280,000	-85,000	7.8%	12.4	12.3
OHIO	47	2	186,000	140,000	-46,000	5.9	8.4	9.6
INDIANA	22	1	94,000	70,000	-24,000	6.4	9.6	10.1
NEW YORK	14	-	65,000	50,000	-15,000	7.1	7.6	7.6
MISSOURI	8	3	30,000	15,000	-15,000	4.5	7.0	7.7
WISCONSIN	10	-	22,000	18,000	- 4,000	4.5	7.0	7.8
NEW JERSEY	6	2	20,000	12,000	- 8,000	6.9	7.2	7.3

1/ Seven out of 26 auto states represent 75% of auto manufacturing related employment

2/ Includes manufacturing workers, including those on temporary layoff, but not corporate staff who may be headquartered in the state.

Under the program, the Department of Transportation in 1981 provided technical assistance briefings to communities to explain the nature of the changes occurring in the industry. Generally, the audiences consisted of community political and business leaders and local labor representatives. In all, 15 communities were visited. DOT provided a three-part briefing: (1) the changing nature of the vehicle being produced and the resulting impact on manufacturing facilities; (2) factors affecting future employment levels; and (3) the significance of the Japanese production cost advantage.4/ The Japanese production cost advantage was included because the adoption of similar techniques by the U.S. firms could affect both employment levels and plant locations.

4/ For a summary of the presentation see: Byron, George; O'Connell, Michael; and O'Donnell, John, "Identifying Automotive Changes in Facilities and Capital Equipment and Assessing Community and Employment Impacts," U.S. Dept. of Transportation, May 1981.

Dealer and Supplier Impacts

New Car Dealers

All dealers, domestic and import, felt the impact of the lagging 1981 sales and the higher inventory-carrying or "floorplan" costs due to high interest rates. The foreign manufacturers have generally given their dealers a longer grace period on payment -- 60 to 90 days from delivery. The U.S. manufacturers usually require more prompt payment, but have often offered low interest floorplanning through their finance subsidiaries. During 1981, a total of 984 retail new car outlets for the big four manufacturers went out of business (Table XVI), with more than two-thirds of the failures occurring in the second half of the year. The number of dealers representing U.S. domestic manufacturers has been declining continuously since 1957, but the 1981 failure rate of 4.52 percent was well above the 26 year average of 2.52 percent per year. The fact that the 1981 failure rate was lower than in 1980 when 1607, or 6.87 percent, failed may be in part attributable to better expense control methods by those dealers strong enough to survive the previous year.

Table XVI

LOSSES IN NEW CAR RETAIL OUTLETS

	U.S. "BIG FOUR"		DOMESTIC & IMPORT	
	OUTLETS	LOSS	OUTLETS	LOSS
Jan. 1, 1978	24,147		28,656	
		96		144
Jan. 1, 1979	24,051		28,512	
		672		621
Jan. 1, 1980	23,379		27,891	
		1607		1558
Jan. 1, 1981	21,772		26,333	
		984		630
Jan. 1, 1982	20,788*		25,703	

Source: Automotive News

* As of 1981, Volkswagen of America outlets were treated by Automotive News as domestic rather than foreign. The change brings the January 1, 1982 domestic total up to 21,680. Based on a similar reclassification for January 1, 1981, the 1981-82 loss was 992 outlets.

Two sources of dealer income improved in 1981. Used car sales were up 30 percent from 1980 and revenues from the sale of parts and services improved by 15 percent. The improvement in parts and service business is typical for a cyclic economic downturn. The aftermarket industry has traditionally exhibited counter-cyclical behavior. When hard times depress new car sales, consumers have tended to spend more to keep the old cars running. In 1979 and 1980 the pattern was broken as aftermarket revenues fell along with the new

car market. The return to more normal counter-cyclical aftermarket behavior reinforces the speculation that the three-year-long depression in the auto industry was caused by several different forces whose influence varied over the period.

Suppliers

Auto manufacturers around the world are supported by a vast network of supporting industries supplying parts, materials, and production equipment as well as other indirect services such as transportation, insurance, utilities, etc. Historically, 55 percent of the U.S. auto industry's revenues have been spent on the purchase of goods and services. This percentage ranges from approximately 50 percent for General Motors to over 80 percent for American Motors.

The U.S. auto manufacturers rely on approximately 40,000 domestic supplier firms. These range in size from multinational conglomerates to small family-owned businesses employing several people. In 1979, the U.S. auto companies spent an estimated $73 billion worldwide on materials, parts, services and equipment and about $55 billion in the United States. The Transportation Systems Center (TSC) has estimated that these purchases supported 1.4 million jobs in the U.S. supplier sector.

As can be seen in Table XVII, the majority of suppliers to the auto industry in 1979 were small firms employing 25 or fewer people. However, these small

Table XVII

SEGMENTATION OF SUPPLIERS TO THE U.S. AUTO INDUSTRY

NUMBER OF EMPLOYEES	NUMBER OF SUPPLIERS	PERCENT OF TOTAL (%)	EXPENDITURES TO SUPPLIERS 1979 (BILLIONS)	PERCENT OF TOTAL (%)	AVERAGE EXPENDITURE PER SUPPLIER (MILLIONS)
1 - 25	21,500	54	$ 6.3	11.4	$ 0.3
26 - 99	11,650	29	$ 8.8	15.9	$ 0.8
100 - 499	5,050	13	$18.2	33.0	$ 3.6
500 +	1,800	4	$21.9	39.7	$12.2
TOTALS	40,000	100	$55.2	100.0	$ 1.4

This distribution is based on actual GM data for 1979. The distribution of supplier expenditures was calculated by applying the ratio of the GM expenditure data to estimated total industry supplier data for 1979.

Source: U.S. Transportation Systems Center.

firms accounted for only 11.4 percent of expenditures to suppliers or about $300,000 per firm, while firms with 500 or more employees accounted for nearly 40 percent of the expenditures or more than $12 million per firm. A survey performed for TSC found that the top 50 suppliers of parts and materials to the U.S. auto companies accounted for about 27 percent of the latter's supplier purchases worldwide. While the dollar value of supplier expenditures is greatly skewed in favor of a few large multinational firms, there is still a significant network of smaller suppliers, over 30,000, averaging less than one million dollars per year in auto-related business, that has been instrumental in supporting the auto industry.

Although domestic passenger car and light truck sales remained at depressed levels through 1981, as the result of extensive cost cutting and general tightening of their operations, a number of the major component manufacturers were able to show some increase in the ratio of their 1981 auto-related operating income to auto-related revenues (Table XVIII). Following the sharp domestic motor vehicle sales decline from 1979 to 1980, the parts suppliers reduced their fixed operating costs, and were better able to handle the depressed 1981 market. Those manufacturers with product lines balanced between original equipment parts and replacement parts tended to have better financial position than those manufacturers only in the original equipment market because, as stated earlier, the sale of replacement parts tends to be counter-cyclical.

Table XVIII

AUTOMOTIVE-RELATED REVENUE AND INCOME FOR SELECTED SUPPLIER FIRMS*

(Billions)

	1978	1979	1980	1981
Auto-Related Revenue	$6538.3	$7263.9	$6692.1	$6252.7
Auto-Related Operating Income (Before Tax)	$ 755.6	$ 810.9	$ 448.2	$ 525.1
Auto Operating Income / Auto Revenue	0.12	0.11	0.07	0.08

*Companies Analyzed

Dayco	Bendix	Excell-O	Douglas & Lommsan
Eagle-Picher	Echlin	Rockwell	
Sheller Globe	Eaton	Sealed Power	

Source: U.S. Transportation Systems Center.

Machine Tool Suppliers

During 1981 the machine tool industry was particularly affected by the declining financial position and uncertain future domestic product plans of the prime manufacturers. Several major tooling programs have been either postponed or cancelled, including new three-cylinder gasoline engines and the conversion of older rear-wheel drive large cars to front-wheel drive. The cost of these programs, including engineering, research and development, and start-up costs, has been estimated by TSC to be between $7 and $10 billion. In 1980, the machine tool industry had backlogs that averaged 18 months: at the start of 1982, they averaged 10 months. The year 1981 was the worst in terms of new orders that the domestic machine tool industry had seen since 1976.

Net new orders for metal cutting machine tools were 43 percent less in 1981 than in 1980, just $2.3 billion compared with $3.9 billion the year before (Table XIX). In the face of continuing uncertainty about future gasoline prices and continued scarcity of financial resources, the prime manufacturers may be unwilling to undertake machine tool buying programs in 1982 beyond those for which they are firmly committed.

Table XIX

ORDERS TO THE DOMESTIC INDUSTRY FOR METAL CUTTING MACHINE TOOLS

(Billions)

Net New Orders	1980	1981
Domestic	$3.5	$2.0
Foreign	$0.4	$0.3
Total	$3.9	$2.3
Shipments		
Domestic	$3.2	$3.6
Foreign	$0.5	$0.6
Total	$3.7	$4.2

Source: American Metal Market, Metal Working News Edition, Vol. 90, No. 16, January 25, 1982, New York, New York.

Supplier Employment

Available information on auto-related layoffs and plant closings in the supplier sector is less complete than for the prime manufacturers. TSC estimates that approximately 500,000 U.S. supplier jobs have been lost due to the industry downturn, with over 90 percent of those job losses concentrated in the industrial Midwest states. Two studies done for TSC by Harbour and Associates, Inc., of Berkley, Michigan, have measured the effects of auto-related dislocation on a Michigan county and on major suppliers in the United States.

In a study of auto-related companies in Wayne County (Detroit), Michigan (Table XX), Harbour identified 1274 establishments supplying parts, materials, tooling and services to the auto industry. From 1978 to 1981, employment declined at these plants by 29,200 people or 31 percent, and in 1981 36 plants, or 2.8 percent of the total, closed or made plans to close operations. Extrapolation of the Wayne County data to the State of Michigan would indicate that over 300 Michigan suppliers have closed or plan to close their operations, and 175,000 supplier industry jobs have been lost in the State.

Table XX

WAYNE COUNTY, MICHIGAN SUPPLIER SURVEY (1978-1981)

Plant Size by Number of Employees	Prime Manufacturer Owned Plants		Supplier Plants				
	Plants in 1978	Closed or Closing in 1981	Plants in 1978	Closed or Closing in 1981	Employment in		
					1978	1980	1981
1 - 25	--	--	769	9			
26 - 99	4	--	345	15			
100 - 499	13	2	143	7			
500 +	49	6	12	5			
Total	66	8	1274	36	94,400	87,600	65,200

In a second study looking at the U.S. suppliers of automotive parts and materials, Harbour surveyed 450 companies, about 20 percent of the major U.S. suppliers. Over the 1978 to 1981 time period, employment declined by 150,000 (35 percent), and 60 plants (3.5 percent) of those studied were closed. In summary, these two studies that have identified almost 100 supplier plants which have closed and about 200,000 supplier jobs which have been lost over the past three years are in agreement that 31 to 35 percent unemployment has taken place in the industry. Extrapolated to 1.4 million total jobs, unemployment at this rate would total 430,000 to 490,000.

Chapter III. -- OUTLOOK FOR THE U.S. AUTO INDUSTRY

Domestic and Global Demand

Forecasts of U.S. and world demand for motor vehicles over the next ten years are characterized by considerable uncertainty. No forecast dealing with consumer behavior can be wholly reliable, but the present situation in world energy supply and price, the vagaries of world and national economics, and the possible long-term change in consumer perceptions of the automobile inject new questions. Respected forecasters differ with each other and, in several instances, projections by the same forecaster have changed substantially over a few months. The auto industry, which needs to plan production at least six months or a year ahead and often begins developing new models as much as five years ahead, must find ways to deal with the uncertain future.

U.S. Domestic Demand Forecasts

Most forecasters agree that the general outlook for U.S. auto demand includes a strong recovery in sales once the economy begins to recover, with a leveling off in two or three years, followed by a long period of slowly increasing demand. As shown in Figure 8, however, an envelope of forecasts made recently by several respected econometric forecasting services shows differences of nearly 2 million units as early as 1984. Although the figure shows only the single optimistic truck sales forecast, the range of uncertainty in truck sales is, if anything, more broad than for automobiles.

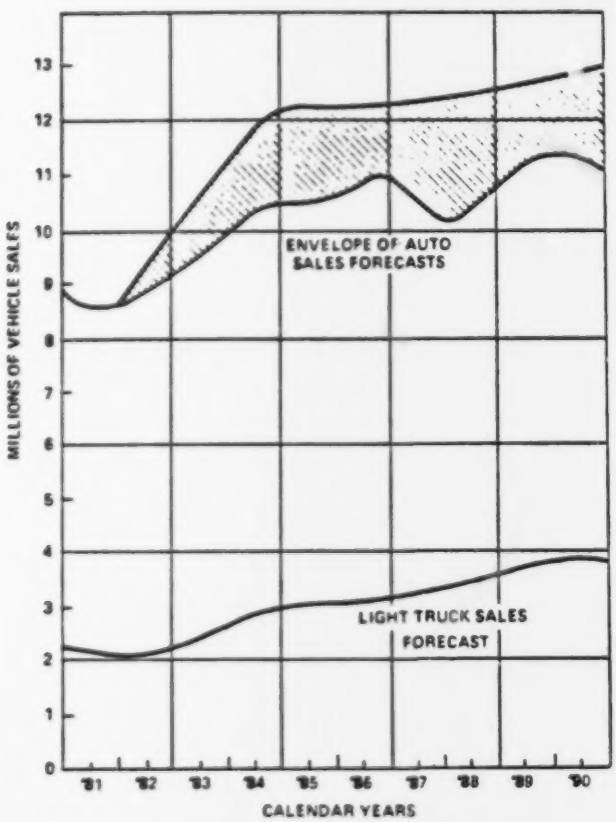

FIGURE 8 FORECASTS OF U.S MOTOR VEHICLE DEMAND

Sources:

Data Resources, Inc., U.S. Long-Term Review, Trendlong 1281, Cyclelong 1281, Winter 1981-82, Lexington, MA.

Chase Econometrics, Long-Term U.S. Macroeconomic Forecasts, Cycle 11/10/81, High Growth 11/10/81, Low Growth 11/10/81, Moderate Growth 11/9/81, Bala Cynwyd, PA.,

Wharton Econometric Forecasting Associates, The Wharton Annual Model Post-Meeting Forecast, December 1981, Philadelphia, PA.

Evans Economics, Inc., U.S. Macro Forecast, October 24 (1981), Base 881, Standard Ten-Year Forecast, November 1981, Washington, D.C.

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Some of the uncertainty regarding near-term auto and truck sales stems, in turn, from uncertainty as to when the national economic upturn will begin and how soon it will impact vehicle sales. Perhaps a greater source of uncertainty, however, is the unknown extent to which consumers' perceptions of their need for new motor vehicles have changed.

In previous recessions, low sales periods have generated a "pent-up demand" that has in turn reinforced sales "booms" when recovery began. Available data show that the auto fleet is aging and that some buyers, particularly buyers of larger cars, would, under historically "normal" conditions, be well overdue for a trade-in of their old cars. But we also know that the increasing costs of operating a car, particularly the high cost of fuel, have put severe pressure on the personal budgets of many Americans.2/ Furthermore, the annual number of miles driven per capita has decreased since 1978. There is reason to suspect that some Americans have adopted lifestyles that require less driving and are stretching out the life of their cars even beyond that which is caused by the recession. The degree to which consumers will revert to older habits as inflation subsides and fuel prices moderate is not known. The question is not "is there really pent-up demand?", but rather, "how much pent-up demand is there?"

Another area of uncertainty is the degree of consumer preference shift back toward larger cars. In the last months of 1981 and early in 1982, the market share of full size and luxury cars has increased slightly. Obviously two or three months of sales do not establish a firm trend, especially since the share of subcompacts also increased slightly. Nevertheless, the coincidence of an increase in the large car segment with the decline in fuel prices suggests that another shift in consumer preference might be taking place. The principal impact, so far, has been to add to the uncertainty in the manufacturers' production planning.

Perhaps the most difficult area of uncertainty lies in predicting future fuel prices. Most forecasters believe there will be a long-term rise in the real price of fuel, although the price is expected to decline in 1982 (see Figure 9 for one such projection). As can be seen in that figure, the past two sharp rises in fuel price have been triggered by political events in the Middle-East, the timing of which was not predicted. Whether there will be another sharp increase in the future, like those in 1973-74 and 1979-80 or whether there will be smooth and more predictable increases is obviously open to question.

2/ The 1980 Report showed that over the past 20 or more years, Americans have, on the average, allocated 12 to 13 percent of their personal expenditures to automobile transportation. Because fuel prices have risen well in excess of the inflation rate and general inflation pressure keeps consumer from expanding their automobile allocation, people may compensate by driving less, buying cars less frequently or, when they do buy a car, buying a car with better fuel economy.

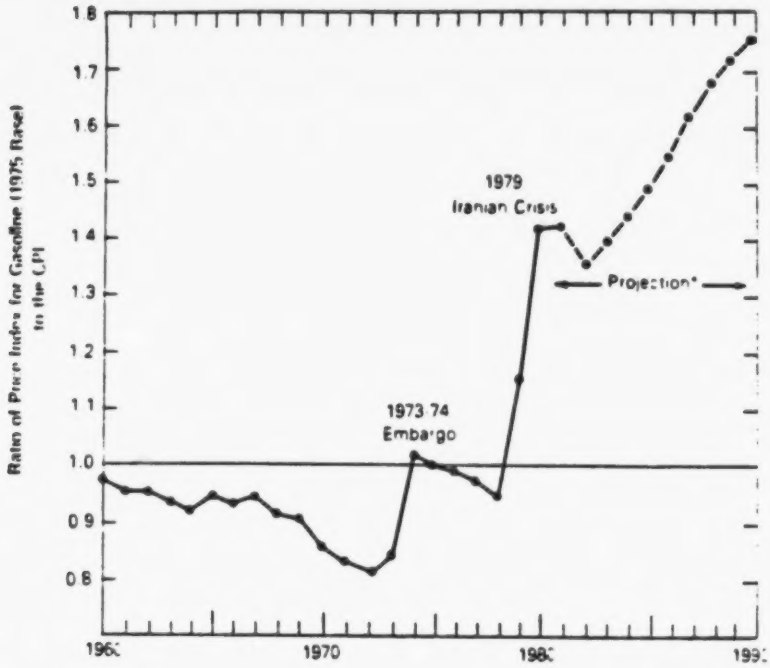

Figure 9 Historical and Projected Gasoline Price

*Projection derived from TRENDLONG 128
The Data Resource U.S. Long Term Review Winter 1981-82
Data Resources Inc

There is the potential for a repetition of the events from 1975 through 1979 when a four-year drift in consumer preference toward larger cars was followed by an immediate demand for the fuel economy of small cars. The U.S. manufacturers thus face a dilemma in their planning. On the one hand, they must examine the advisability of making further investments of scarce financial resources in plant and tooling for small, efficient vehicles when the present market demand does not fully utilize the capacity they already have in place for those vehicles. On the other hand, there remains the threat that a future fuel price rise could again precipitate public demand for fuel economy beyond what the domestic industry can produce. Once again, the Japanese and other foreign manufacturers have been developing lines of very small "micro-mini" cars for their home markets. None are being marketed in the U.S. in part because of market uncertainty but also because of problems in meeting current U.S. safety requirements. Depending on energy development, however, this backlog of foreign manufacturer capacity and capability to build micro-mini cars could be as damaging in the future to the U.S. industry as the Japanese in-place capacity to build sub-compacts was in 1979 and 1980.

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Worldwide Demand

Forecasts of world motor vehicle demand also exhibit a broad range of uncertainty (Table XXI). Practically every forecaster has made a downward revision in predictions over the past year with every region showing a decline in expected sales. Auto usage everywhere was affected by the 1979-80 rise in fuel price but the "rest of world" developing nations, the economies of which were severely hit by high energy costs, were most strongly affected. What had been considered as the most promising growth market by international automobile manufacturers is now projected -- at least by some forecasters --as a slowly growing or even declining market. The wide divergence among forecasts for 1990 illustrates the great uncertainty concerning the auto market in the developing nations and in the world as a whole.

A significant effect of the 1981 decline in world auto sales is the presence of substantial excess capacity for virtually every manufacturer (Table XXII). At present, the unused capacity is a financial drain on many firms, but, for the near future, it means that international competition to serve any increased world demand could be fierce.

Table XXI

Forecasts of World Auto Sales
(Millions of Units)

World Region	Historical Sales		Forecasts for Sales in 1985		Forecasts for Sales in 1990	
	1978	1980	Made in 1981[1]	Range of Recent Forecasts[3]	Made in 1981[2]	Range of Recent Forecasts[3]
North America	12.3	9.9	12.0	11 – 12	12.9	8.0 – 15.6
Western Europe	10.3	10.0	11.1	10 – 12	17.5	9.0 – 14.6
Japan	2.9	2.9	3.2	2.5 – 3.5		2.0 – 5.8
"Rest of World"	5.7	5.5	7.6	7.6 – 16	6.4	6.4 – 27
World Total	31.2	28.3	33.9	32.5 – 43.5	36.8	25.4 – 63.0

SOURCES

[1]Economic Models, Ltd., World Auto Forecast Report, London, April 1981.

[2]Automotive News, "Long Term Gain Seen for Foreign Markets," April 6, 1981, p. 30 (derived from analysis by A. Gary Shilling & Co.)

[3]Other Forecasts by: Euro Finance, European Car Industry Report, London, 1980. Krish Bhoskar, The Future of the World Motor Industry, Nickels Publishing Co., London, 1980. Iron Age, June 2, 1980, p. 37. Predicasts, Inc., World Motor Vehicles, May, 1978.

Table XXII

ESTIMATED WORLDWIDE AUTO PRODUCTION CAPACITY

	PASSENGER CAR CAPACITY (Million)	TRUCK CAPACITY (Million)	CAR/TRUCK CAPACITY (Million)	TOTAL PRODUCTION (Million)	1981 CAPACITY UTILIZATION (%)
NORTH AMERICA (U.S. & Canada)	10.0	4.0	14.0	9.2	66
WESTERN EUROPE	13.0	2.0	15.0	11.9	79
JAPAN 1/	7.0	4.0	11.0	11.2	102
LATIN AMERICA	1.5	0.5	2.0	1.5	75
OTHER	3.5	2.0	5.5	4.0	73
TOTAL	35.0	12.5	47.5	37.8	80

Source: Harbour and Associates, Inc. and TSC.

1/ Japan capacity estimate is nominal straight time capacity as calculated for U.S. manufacturer operations. Japanese workers are scheduled for 25 hours of planned overtime per month which translates to scheduled or planned capacity of approximately 13 million vehicles and their 1981 production was 86 percent of that capacity. The worldwide capacity utilization was 76 percent on that basis.

Financial and Employment Outlook

Near-Term Financial Prospects

The near-term financial outlook for the U.S. auto industry depends primarily on two factors: the strength and timing of the sales recovery when the national economy begins to recover; and the ability of the manufacturers, in concert with labor and suppliers, to reduce manufacturing costs. In either case, the immediate need is to increase the margin between sales revenues and total operating costs.

The cost reductions the manufacturers were able to effect in 1981 as well as those which can be implemented in the near term, will enhance the industry's ability to survive the poor sales in the beginning of 1982 as well as take advantage of a later market recovery. Each one percent saving in unit manufacturing cost generates about $1 billion additional funds from operations. In 1981, the industry's cost-saving resulted in a $3.8 billion improvement in their funds available as a "cushion" against poor 1982 sales and an added margin when sales recover. The new spirit of labor/management cooperation evidenced by the 1982 contract re-negotiations is a hopeful sign that cost reductions may continue. With continued export restraints by the Japanese, any added sales in 1982 will benefit principally the domestic manufacturers.

Even the possible slackening in demand for fuel economy could prove a near-term benefit for the domestic manufacturers by reducing the pressure for new plant and tooling expenditures and allowing them to enjoy additional returns on past investments in rear-wheel drive technology. Some plant closures of older model facilities have been delayed and new investments postponed.

While the outlook for 1982 is not as bleak as the first quarter's sales might imply, it cannot be concluded that there are no dangers for the year and that the industry can relax its efforts. The manufacturers' finances are stretched thin and their reserves are low. Some of the 1981 cost savings were in plant closings and white collar layoffs that cannot be repeated. Although the new agreements negotiated with Ford and with General Motors (as well as with key supplier firms) generate immediate savings primarily through near-term wage deferrals and increased worktime, the crucial elements in these contracts over the longer term may well be the stability in cost control and the enhanced sense of shared responsibility which they promote.

Of more current concern, however, are differences among the several manufacturers in their potential for 1982 cost savings. As was noted in Chapter II, the manufacturers differ in their cash reserves and in their ability to borrow to finance additional plant and tooling expenditures. For those for which such borrowing is difficult, continued cost reduction from improved equipment may depend heavily on the strength of their 1982 sales.

Longer-Term Financial Prospects

With further annual cost savings and improving sales in 1983 and beyond, the U.S. automobile industry could begin to generate sufficient funds from operations to begin to retire its long-term debt and rebuild its working capital. To do so while continuing to make substantial investments in plant and tooling will be a formidable task, requiring:

- Continued management and labor cooperation in reducing variable and fixed costs in both prime manufacturer and supplier companies
- Continued improvement in overall U.S. vehicle sales
- Continued or expanded market share for U.S. domestic manufacturers
- Continued development of vehicle designs demanded by the public and of sufficient plant capacity to produce those vehicles in the quantity demanded.

Employment Prospects

The potential for continued industry measures to reduce manufacturing costs makes the financial outlook hopeful, but injects uncertainty into employment prospects. On the one hand, it is essential for the industry to become more quality and cost-competitive if it is to regain domestic market share and improve its penetration in world markets. As the next section will show, a good start has been made toward improving the quality of the vehicles being produced, and reducing the cost of their production. These actions, combined with the important wage and benefit concessions embodied in the 1982 labor contracts, will substantially improve the domestic manufacturers' capability to hold and increase their market share.

On the other hand, some of the techniques for quality improvement and cost reduction which are now being implemented result in fewer labor-hours needed to perform various operations. As those techniques are implemented by the industry, the number of workers needed to manufacture a car will decrease even as the number of cars being produced increases. It must be understood that not all of the innovative techniques eliminate jobs and that most of the present unemployment has not been caused by implementation of those techniques. Considerable savings will be realized from reductions in inventory costs, warranty costs, materials costs, energy costs, interest costs and capital costs. Much of the present unemployment is associated with production volume reductions to match decreased demand. Some jobs have been lost because of the lower quantities of materials (such as iron, steel and rubber) needed in the smaller vehicles being produced. Some plants have been closed because their products (such as frames, drive shafts or rear transmissions) are no longer used in the new front-wheel-drive designs. But it is true that some workers have been replaced by robots and some jobs have been eliminated by more efficient manufacturing methods.

As the strengthening national economy improves auto sales, increasing production will lead to reemployment of many of those currently laid off,

particularly those on temporary layoff. Some of those on indefinite layoff, however, may not be recalled and some of the plants now closed will remain so. There are too many uncertainties involved to allow estimation of a reliable industry employment scenario. If economic recovery is strong and demand builds up rapidly, substantial reemployment will result in the near-term. In the longer term, as the gain in sales slacks off and cost-cutting measures continue to be implemented, the total work force may level off or decline. Even though production volumes may regain or surpass 1978 levels, as some forecasts indicate for the late 1980's, it is unlikely that the auto-related work force will again reach 1978 levels.

Improving U.S. Competitiveness

The U.S. auto industry faces two long-term challenges: improving the consumers' perception of the quality of domestically-produced vehicles in order to increase their market share, and lowering manufacturing costs. The industry has made progress in both areas over the past year, both in recognition of the problems and in taking steps toward their solution. Much more remains to be done, however. As discussed earlier, the industry will be facing considerable uncertainties in its market and will for some time remain in an overextended financial condition. The outlook, nevertheless, may be hopeful in light of the steps being taken by and between labor and management to come to grips with their mutual problem.

Improving Product Quality

The U.S. manufacturers, as a result of their unprecedented capital expenditures, have significantly improved their product position relative to their international competition -- particularly the Japanese -- in the U.S. passenger car/light truck market.

- Over the past three years, the U.S. industry has moved from having the capacity to produce less than a million new-design, high-fuel economy cars and no compact trucks to a present capacity to produce 4.5 million new small cars and nearly a million compact trucks.

- Front-wheel drive (FWD) has, to some extent, been linked with advanced technology by the public. In the 1981 calendar year, nearly 80% of the cars sold by Chrysler, 34% of the cars sold by Ford, and 26% sold by General Motors, were FWD. These are higher percentages than for either of the two leading Japanese companies in the U.S. market (23% for Toyota and 18% for Nissan.) Overall there were about 2,150,000 front-wheel drive domestic cars sold in 1981 compared to about 762,000 front-wheel drive Japanese cars.

- In comparisons of the fuel economy of 1982 gasoline fueled cars in the same weight classes, domestic cars have better average fuel economy than foreign entries in 15 of the 16 weight classes in which both compete.

- Domestic manufacturers have continued to make progress in reducing scheduled maintenance costs. Scheduled maintenance costs for domestic subcompacts are about 35 to 60 percent of the scheduled maintenance costs for comparable size imports.

- Domestic small cars have retained their used car value as well as, and in some cases better than, imported cars (based on a comparison of selected 1978 to 1980 Ford, General Motors, Toyota and Nissan small cars.)

- Based on actual loss experience, Japanese cars are more likely to incur an insurance surcharge than are domestic cars. Of the 15 Japanese car lines rated, 12 carry insurance surcharges, two the base rate, and only one receives a discount. Of the 62 domestic lines rated, only 10 have surcharges, and 38 have discounts.

It may be difficult for the U.S. industry to widen its lead in these technology-oriented areas because of the greater financial resources currently available to Japanese manufacturers. U.S. corporate research budgets have felt the pinch of adverse sales and new plant or tooling expenditures may be curtailed in 1982. However, a number of innovative and low cost quality control systems, which were first applied broadly in the automobile industry in Japan, are now being considered and successfully introduced in the American industry.

Among such techniques is a system of quality control known as "defect prevention" which is closely akin to "zero-defects" programs tried in other U.S. industries.1/ In such a system each worker inspects previous work on a component or assembly and has the right to call in roving repair crews (in the event of a minor defect), or to stop the production line (in the event of a major problem) when a defect is encountered. This system places far greater reliance on worker discretion in dealing with production defects than the system generally employed in the U.S. Most American auto manufacturers have used a system of "defect detection" in which an inspector flags observed defects and they are later repaired off-line. "Defect detection" is designed to allow high production speeds while keeping defects within a statistically tolerable range; the "defect prevention" system employs maximum quality control, but at sometimes less than maximum production rates.

An additional system of quality improvement utilized by the Japanese is the practice of "mass relief" of production workers. The system has, as its basic premise, the concept that a worker who constantly repeats a job is an "expert" at that job and thus less prone to error. In order to allow employee rest periods, the entire production line is stopped for a mass relief period. The mass relief system is most applicable to continuous operations. It is being tried by U.S. manufacturers such as Chrysler. The usual American practice, by contrast, has been one of "tag relief" whereby a relief team member replaces workers in succession. The practice is used in order to keep the assembly line moving but means, in addition to a need for more workers, that at any given time approximately 10 percent of the workers on an assembly line are not the best available "experts".

1/For discussions of these see: James E. Harbour, "Comparison and Analysis of Automotive Manufacturaing Productivity in the Japanese and North American Automotive Industry for the Manufacture of Subcompact and Compact Cars," (Berkley, Michigan: Harbour and Associates, Inc.) 1981. (Copyrighted report, available only from author).

Robert E. Cole. "Japanese Lesson in Quality" Technology Review (July 1981) p.29-31.

"The New Industrial Productivity" Business Week (May 11, 1981) p. 85-98.

Reducing Manufacturing Cost

Some of the low capital cost techniques for improving manufacturing efficiency deal with inventory control -- the "Just in Time" system -and with optimizing the use of worker capabilities. Although many of the better descriptions of these techniques are from the Japanese literature, the U.S. manufacturers have been adapting them to current domestic conditions and implementing them in their facilities.2/

The "Just-in-Time" production system is used to minimize in-process inventories at all levels of production. Inventory levels are kept as low as possible by daily or even hourly deliveries from suppliers and close control of ordering. Several benefits accrue from the use of this type of inventory control system: less cash is tied up in inventory; there is reduced need for storage facilities; expenses for utilities are reduced as are the need for security and insurance connected with maintaining inventory; there is reduced material-handling time and manpower; breakage from material handling is reduced; and there is rapid highlighting of quality problems in material being delivered. While the benefits of a just-in-time inventory system are apparent, the system used in Japan was not developed overnight. Several factors, such as localized plant complexes, shorter shipping distances, and stable long-term production schedules have facilitated the adoption of this system by the Japanese. Reducing the number of factory options and not accepting customer factory orders (itself perhaps a response to longer supply lines to retail outlets) also reduces the complexity of the inventory requirements of Japanese manufacturers.

The in-process inventories of American manufacturers were in earlier years a considerably smaller part of overall costs. The recent dramatic escalation in interest rates emphasizes and magnifies both the acquisition and holding cost of large in-process inventories. It must be stressed, however, that some characteristics of the American auto industry structure (e.g., longer shipping distances, rail delays and uncertainty, multiple suppliers, more factory options, customer factory orders, potential work stoppages, etc.) will mitigate against the just-in-time technique becoming widespread.

2/ For discussions of "Just in Time" production see the references footnoted on page 3 as well as.

Robert H. Hayes. "Why Japanese Factories Work" Harvard Business Review (July/August 1981) p. 59.

Y.Sugimara. et.al. "Toyota Production System and Kanban System: Materialization of a Just-in-Time and Respect for Human System" translated from Japanese Toyota Production System available through Production Control Dept., Toyota Motor Co. Ltd. 1, Toyota-Cho-Toyota-shi 471 Japan.

Examples of recent actions taken by automotive manufacturers to adopt "Just-in-Time" type production systems are:

- o General Motors Corporation
  - The Saginaw Steering Gear Division plans to reduce in-process inventories by 25 percent by adopting a "Just-in-Time"/"Kanban" type production system.
  - The Buick Division plans on having their suppliers, 80 percent of which (on a dollar basis) are within 75 miles of Flint, run on a "Just-in-Time" production system.
  - The Chevrolet Division piloted a "Just-in-Time" production system with a new seat supplier who located a plant two miles from the Moraine, Ohio, S-10 Truck Assembly Plant.
- o Ford Motor Company
  - The Utica Trim Plant supplies the Wayne Assembly Plan via truck on a twice-a-day "Just-in-Time" production system basis.
  - The Saline Plastics Plant supplies instrument panels to the Wixon Assembly Plant on a daily "Just-in-Time" production system basis.
- o Chrysler Corporation
  - The Trenton Engine Plant supplies the Belvidere, Illinois, Assembly Plant on a daily "Just-in-Time" production system basis.
  - The Kokomo, Indiana, Transmission Plant supplies the Belvidere, Illinois, Assembly Plant on a daily "Just-in-Time" production system basis.
- o Nissan Motor Manufacturing Corp. U.S.A.
  - Hoover Universal, Inc., has agreed to supply seats to Nissan's Smyrna, Tenn., Truck Assembly Plant from a new nearby plant on a "Just-in-Time" production system basis.

A second cost saving technique is the concept of "quality circles"3/, an expansion of the premise that each worker is the expert on his or her particular job. In Japan quality circles are groups of from 6 to 12 employees who meet to discuss methods of more efficiently structuring their jobs, work flow, and machinery utilization. Although management participates in these discussions the judgment of the workers is usually upheld in structuring their jobs. This system uses a "bottom-up" approach, with employees participating in key decisions to solve problems and improve management. Similar systems, called "Quality of Work Life" at GM, "Employee Involvement" at Ford, etc., have been introduced by all the U.S. manufacturers and are beginning to show success.

3/ See Japan Quality Circles, Asian Productivity Organization (Tokyo: 1972).

Supplier Industry Prospects

A number of factors will affect the future of the domestic supplier industry; the large multinationals appear better able to cope with the problems, but all supplier firms will be impacted.

Changing Market Size

The slump in new-car production reflects directly on supplier business. Business cuts have not been even across the board; there has been a trend to consolidate contracting and cut off some smaller suppliers. Declines in auto revenues have severely hindered the ability and willingness of many suppliers to expand or improve their auto-related operations.

Changing Technology

Changes in the size and design of cars have altered the supplier market. The average car in 1990 may weigh 1,000 pounds less than the 1978 vehicle. The smaller cars need less iron, steel, rubber, glass, etc. Front-wheel-drive designs eliminate rear axles, differentials, drive shafts and frames, but open a market for transaxles, constant velocity joints and MacPherson struts. The use of aluminum, high-strength steel and plastics is increasing as are electronic control and display equipment. The larger firms have often been able to switch products, but many smaller, single-product firms are losing out due to their inability to adapt to the changing market.

Increased Penetration of Foreign Autos and Parts

There have been some sales by U.S. suppliers to foreign manufacturers, for U.S. consumption. The increase in sales of imported cars and new sourcing plans, however, have generally meant a loss to U.S. firms in both the original equipment and aftermarket. Foreign-made goods for U.S.-made cars have made particular inroads in the aftermarket sales of prepackaged replacement items sold through drug stores, discount chains, etc. In addition, over 30 foreign firms have recently established plants in the U.S. According to the Japanese Auto Parts Industries Association, about a dozen Japanese have established or plan to establish U.S. plants. At the same time, the major U.S., European and Japanese suppliers have been involved in over 50 joint ventures and acquisitions.

Overseas Sourcing by U.S. Manufacturers

U.S. auto manufacturers have, for many years, been willing to import materials and equipment where the foreign supplier provided high quality, reliable, cost-competitive products. This import price competition has increased dramatically in recent years as some developing nations with low wage rates have developed their industrial capabilities.

The governments of many developing nations have given strong support to industrialization, not only by offering tax and other concessions to firms willing to establish plants, but by imposing local content rules that require local purchases from any firm which markets in that country.

In most cases, the rule does not require that each vehicle sold in the country actually be composed of some percent of locally-procured parts, but rather that the total value of purchases by the firm in the country be some fraction of the total value of its sales there. Local content rules have caused some U.S. manufacturers to set up overseas plants or to encourage their suppliers to do so.

Much recent overseas sourcing by U.S. manufacturers has been because of the capital and lead-time constraints on retooling domestic plants for new production. Prior to 1979, the U.S. produced less than two million 4-cylinder engines, no small diesels, and almost no engines configured for transverse installation. New engines are time-consuming and expensive to develop from scratch, and the typical U.S. V-8 engine production line could not easily be converted to inline 4-cylinder designs to meet the needs of the new product lines. It was both cheaper and faster to contract for these engines from foreign manufacturers who already had them in production. In many cases, the U.S. manufacturers have subsequently retooled domestic plants for engine production. Today, industry has the capacity to produce over 5 million domestic 4-cylinder engines (over 30 percent of domestic engine production capacity). However, the present shortage of funds for tooling, the market uncertainty for diesel engines1/ and the pressure of foreign local content rules make it unlikely that imports of engines will decline in the near future.

Overall, TSC estimates that nearly 2.5 million engines, 1.7 million transaxles and a variety of other major components will be imported each year by the three major auto producers. As Table XXIII shows, these are divided between those brought in from Mexican and Brazilian subsidiary or "captive" plants of the U.S. manufacturers, and those sourced to independent foreign firms. Many other smaller components are being studied for potential outsourcing to lower cost suppliers, both domestic and foreign. Future outsourcing, consolidation of production, and diversification away from auto-related production will be the primary issues facing the supplier firms in the 1980's.

Prime Manufacturer Cost and Quality Programs

The introduction of the quality control and cost reduction techniques discussed in the previous section will affect suppliers as well as the prime manufacturers. The emphasis on product quality means that the "zero defects" concept will extend to the externally-supplied components as well as in-house manufactured parts. Not only will this require increased production precision by suppliers but also a greater level of cooperation between suppliers and the prime manufacturers in engineering quality into the products. Suppliers may be involved in the early design and development stages of new models to ensure complete integration of designs.

The just-in-time cost reduction concept, likewise, will require much closer cooperation between suppliers and prime manufacturers. If the full benefits of inventory control are to be realized, the suppliers must match their

1/ In the winter of 1981-82, gasoline prices fell below diesel fuel prices in many locations. The market share of diesel-powered cars declined.

Table XXIII

PROJECTED NEAR TERM OFF-SHORE SOURCING OF SELECTED PARTS AND COMPONENTS (IN THOUSANDS/YEAR)

Item	Overseas	
	Captive	Independent
Engines		
Gasoline		
2.8L 6 Cyl	200 (Mexico)	
2.3L 4 Cyl	300 (Mexico)	
2.3L 4 Cyl	150 (Brazil)	
2.2L 4 Cyl	200 (Mexico)	
1.8L 4 Cyl	225 (Brazil)	
2.0L 4 Cyl		400 (Japan)
1.6L 4 Cyl		150 (France)
2.6L 4 Cyl		200 (Japan)
Sub-Total	1075	750
Diesel		
2.4L 6 Cyl		50 (Austria)
1.9L 4 Cyl		100 (France)
2.2L 4 Cyl		150 (Japan)
2.0L 4 Cyl		100 (Austria)
1.5L 4 Cyl		150 (Japan)
1.2L 4 Cyl		100 (Japan)
Sub-Total		650
	1075	1400
Total Engines	2475	
Transmissions		
Transaxles		
– Automatic		500 (Japan)
– Manual		1200 (Japan)
Total		1700
Aluminum Cylinder Heads	–	1300 (Italy)
Alternators/Starters	–	1000 (Japan) 500 (Germany)
Wire Harness Assemblies	5000 (Mexico)	–
Rear Disk Brakes	500 (Brazil)	–
Constant-Velocity Joints	–	600 (France)

Source: John O'Donnell, "Restructuring of the Auto Industry and the Impact on Employment," U.S. Transportation Systems Center, Cambridge, Massachusetts, February, 1982.

production and delivery rate to the prime manufacturer's assembly schedule. Suppliers may need to alter their production methods, change their transportation systems and perhaps even relocate plants to achieve the delivery reliability that just-in-time demands.

In Japan, cooperation between the prime manufacturer and the suppliers is enhanced by the industrial groups2/ of which both are members and share the benefits of financial, management and engineering support. In the U.S., closer cooperation between prime manufacturer and suppliers may be enhanced by long-term contractual relationships. The long run result may be a consolidation of smaller suppliers into a smaller number of larger affiliated units. Both Ford and GM have announced plans to move in the direction of closer ties with a smaller number of suppliers.

2/ See Martin L. Anderson. "Strategic Organization of the Japanese Automotive Groups", Cambridge, MA 02139, April 1981.

The Impact of Future Regulations

Regulatory Reform

As part of a Government-wide regulatory review process mandated by President Reagan, those Federal agencies which regulate the auto industry are continuing to examine their regulations in light of current conditions and to weed out those which can no longer show a net benefit. Similar tests will be applied to any proposed new regulations. In the future the burden of unnecessary regulations will be minimized and the manufacturers will be more able to use their own innovative thinking in designing cars to meet market demands.

While great strides are being made in regulatory reform, the goal of achieving improved automobile safety has not been compromised. In seeking other than regulatory solutions, the National Highway Traffic Safety Administration (NHTSA) aims to balance both technological and human factors. Greater emphasis will be placed on the responsibility of the driver to take actions to avoid accidents, and on all occupants to take those actions that will minimize injury if a crash does occur.

Small Car Safety

The safety problem of the shift toward smaller cars is a matter of concern. Based on historical accident data, a passenger in a subcompact auto runs 8.2 times the risk of the passenger in a full-sized car in a collision between the two. Recent improvements in the structural crashworthiness of newer design small cars will reduce the risk significantly, but the root of the problem lies in simple physics. At the same speed, a 4500-lb., full-size car has twice the momentum of a 2250-lb. subcompact. If the two collide head-on, the subcompact will be stopped and thrown backward while the large car only slows down. Clearly, the occupants of the smaller car are subject to greater deceleration forces and, with less survival space, are more likely to suffer injury.

The risk in car-to-car collisions will decrease somewhat as all cars become smaller and lighter and as new technology improves structural crashworthiness. As long as these cars share the highway with trucks that may weigh more than 30 times as much, there will continue to be a risk that no amount of improvement in small car structural crash-worthiness can totally eliminate.

Continuing Safety Programs

NHTSA will continue to explore the technology of auto safety, using a systematic testing program coupled with extensive data collection and analysis. Inquiry into side-door strength improvement will, for instance, be greatly expanded to complement frontal crashworthiness efforts conducted to date. Accident avoidance will receive renewed emphasis, especially better braking performance and lighting systems for passenger vehicles. Cooperative research efforts with industry will focus on advanced technology in passive protection for vehicle occupants. NHTSA will upgrade its cooperation with the automobile industry in the development and testing of safety improvements, sharing both the information benefits and the costs.

Information sharing with the public will be an important element in influencing the human factor side of auto safety. The crash test program has been opened to the public to promote better understanding of the process and of the meaning of the results. Major efforts are underway to increase the use of safety belts, already standard equipment in all cars, and the use of child safety seats. A large-scale public information and education campaign, announced by President Reagan in April 1982, will employ not only mass media approaches, but will tap existing networks of communication like driver educators, science teachers, parent-teacher associations, youth groups, social service organizations, and the medical community, as well as religious, consumer, fraternal and veterans' groups. The safety belt campaign is receiving major support from the industry private sector.

A second major effort announced by the President deals with alcohol safety. Alcohol continues to be related to half the annual highway deaths, with drivers under 25 significantly over-represented. The President's Commission on Drunk Driving will promote effective alcohol program activities in States and local communities. The key elements of success for each participating State's program will be a community focus, a systems approach to look at all facets of the system for dealing with drunk drivers, and the financing of the program through fines, court costs and/or treatment tuition fees paid directly by the offender. Other important elements will deter the would-be drunk driver by the generation of community and citizen support to change societal attitudes toward drinking and driving.